



HALTON REGION SPECIAL NOTICE:

TRANSITION TO THE CCDC 2 (2020) FORM OF CONTRACT AND VENDOR PERFORMANCE MANAGEMENT POLICY

HALTON REGION HAS TRANSITIONED TO THE CCDC 2(2020) FORM OF CONTRACT. PLEASE NOTE THE FOLLOWING:

The Region's contract documents have changed – The Region has adopted the CCDC 2 (2020) Stipulated Price Contract with new Supplementary Conditions, and correspondingly updated its tender documents. The key project-specific details can be found in the Agreement Between Owner and Contractor and the Agreement Term Sheet, located in Appendix 1 of the Supplementary Conditions.

The Region's bonding requirements have changed for projects using the CCDC 2 (2020) Stipulated Price Contract – Bonds will only be required where the tender price is equal to or greater than \$500,000.00. For those projects, the Region now requires Performance Bonds with a coverage limit of 50% of the Contract Price (plus HST), rather than 100%. See the Instructions to Bidders Section 12 for details.

The Region's insurance requirements have changed for projects using the CCDC 2 (2020) Stipulated Price Contract – Insurance requirements can be found in the Supplementary Conditions SC-110 and SC-111, as well as Appendix 3 to the Supplementary Conditions.



**VENDOR PERFORMANCE MANAGEMENT POLICY.
PLEASE NOTE THE FOLLOWING:**

The Region of Halton will be utilizing a Vendor Performance Management Policy as of January 1, 2024 for selected Public Works, and Capital, Construction and Realty, Construction contracts.

The Region will evaluate the Contractor's performance in accordance with the Policy and provide a written evaluation and record of the Contractor's performance of this Contract.

Please refer to the Supplementary Instruction to Bidders and the Instruction to Bidders in the bid document to see whether the Policy applies to this tender and for further details regarding this new policy.



THE REGIONAL MUNICIPALITY OF HALTON

REQUEST FOR TENDERS

T-704-25

REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT AT WOODLANDS OPERATIONS CENTRE, 1179 BRONTE RD, OAKVILLE

***** PRE-QUALIFICATION REQUIREMENT *****

Halton Region will only accept bid submissions from the following vendors that were pre-qualified under Request for Prequalification # T-258(A)-23

Pre-Qualification of General Contractors:

- 2SC Contracting Inc.
- Alpeza General Contracting Inc.
- Anacond Contracting Inc.
- Canada Construction Limited
- Chart Construction Management Inc.
- CPM Group Inc.
- Gen-Pro
- Joe Pace & Sons Contracting Inc.
- MIR Construction Inc.
- Renokrew
- Rutherford Contracting Ltd.
- West Metro Contracting Inc.



THE REGIONAL MUNICIPALITY OF HALTON

REQUEST FOR TENDERS

FOR

**REPLACEMENT OF VARIOUS MECHANICAL
EQUIPMENT AT WOODLANDS OPERATIONS CENTRE,
1179 BRONTE RD, OAKVILLE**

TENDER # T-704-25

BIDS SHALL BE SUBMITTED VIA THE BIDDING SYSTEM AT
<https://haltonregion.bidsandtenders.ca>

******* ELECTRONIC SUBMISSIONS ONLY *******



Supplementary Instructions to Bidders

Contract No. T-704-25

Replacement of Various Mechanical Equipment at Woodlands Operations Centre, 1179 Bronte Rd, Oakville

1. Key Bid Dates:

- a. **Bid Issue Date: Tuesday, March 11, 2025**
- b. **Pre-Bid Meeting and Site Visit:**
Mandatory Site Meeting: Tuesday, March 18, 2025 at 11:00 am

The mandatory site meeting will be held at Woodlands Operations Centre, 1179 Bronte Rd, Oakville, ON.

Bidders who fail to attend and register their attendance at the mandatory site meeting will be disqualified from submitting a Bid.

Attendees will be met at the exterior side entrance to the building. The site meeting will begin promptly at the designated time. Bidders are encouraged to arrive prior to the time indicated above in order to sign in. Refer to section 7 “Pre-Bid Meeting, Site Visit and Site Conditions” of the Instructions to Bidders for further information.

Special notice: Personal Protective Equipment including safety boots will be required to enter the site.

- c. **Question Deadline Date: Wednesday, April 2, 2025 at 4:00 pm**

Any questions regarding this bid document are to be submitted in writing through Halton Region’s Public Procurement Website (<https://haltonregion.bidsandtenders.ca>) by using the “Submit a Question” feature. Refer to section 2 “Any Communications” of the Instructions to Bidders for further information.

- d. **Bid Closing Date and Closing Time:**

Tuesday, April 8, 2025 at 2:00 pm local time

- e. **Irrevocability Period: 90 days from the Closing Date**

REGIONAL MUNICIPALITY OF HALTON

Please note, should the Bidder complete any obligations, including submitting completed documentation, after the Irrevocability Period, the Irrevocability Period shall be extended by the number of days of the delay and the Bidder shall not be entitled to an extension of Contract Time or delay claims as a result of said delay.

2. Key Construction Milestones

- a. **Commence Work:** The successful Bidder shall commence the Work within seven (7) days from the receipt of the Notice of Award Letter.
- b. **Ready-for-Takeover:** The successful Bidder shall achieve Ready-for-Takeover by November 28, 2025.
- c. **Completion:** The successful Bidder shall achieve Completion by December 5, 2025.

Please note, in the event of any conflicting or inconsistent provisions between the Agreement Term Sheet and these terms and conditions, the Agreement Term Sheet shall always prevail and take precedence with respect to any such conflicting or inconsistent provisions.

3. Vendor Performance Management Policy

- a. **The Vendor Performance Management Policy shall apply to the successful Bidder's Contract.** Refer to the Instructions to Bidders, Section 20, Vendor Performance Management Policy for further information.

4. List of Bid Documents

Below is a list of Bid Documents included with this Request for Tender:

Bid Documents	No. of Pages
Special Notice	2
Pre-Qualification Requirement	1
Cover Page	1
Supplementary Instructions to Bidders	2
Instructions to Bidders	49
CCDC 2 – 2020 Stipulated Price Contract	30
Supplementary Conditions CCDC 2 – 2020	67
Appendix 1 to the Supplementary Conditions – Agreement Term Sheet	1
Appendix 2 to the Supplementary Conditions – Proper Invoice Requirements	5
Appendix 3 to the Supplementary Conditions – Insurance	3
Specifications	260
Drawings	12
Hazardous Building Materials Assessment (Pre-Construction)	45
All other documents issued with this Request for Tender that are not listed above	



INSTRUCTIONS TO BIDDERS

February 2025

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1. DEFINITIONS

“Act” means the Construction Act, R.S.O. 1990, CHAPTER C.30;

“Addendum” or “Addenda” means a change, addition or to respond to questions in relation to the Request for Tenders;

“Agreement” means the executed Agreement between the Region and the Contractor for the performance of the Work, included in Appendix “C” of the Instructions to Bidders;

“Award” means the award of a Contract by the Region to one (1) or more Bidders;

“Bid” means a Bidder submission offered in response to a procurement solicitation;

“Bidder” means a Vendor that submits a Bid;

“Bid Documents” means the documents included in this Request for Tender as listed in the Supplementary Instructions to Bidders, and any Addenda issued;

“Bid Security” means the security submitted by the Bidder with its Bid, which provides financial protection to the Region should the successful Bidder not enter into the Contract;

“Bidding System” or “Public Procurement Website” means the Region’s publicly accessible procurement website for issuing procurement solicitations and/or receiving Bids;

“Closing Date” and “Closing Time” means the deadline for submission of Bids as indicated in the Supplementary Instructions to Bidders;

“Construction” means any construction, reconstruction, demolition, repair or renovation of a building, structure, road or other engineering or architectural work;

“Contract” means the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the Contract Documents and represents the entire Agreement between the Region and one (1) or more Contractors for the supply of Goods, Services and/or Construction, or a combination thereof;

“Contract Documents” consist of those documents listed in Article A-3 of the Agreement –
CONTRACT DOCUMENTS;

“Contract Price” means the amount stipulated in Article A-4 of the Agreement –
CONTRACT PRICE;

“Contractor” means the successful Bidder in respect of whose Bid an Award is made;

“Designated Sourcing Representative” means the Regional staff in Supply Chain Management responsible for the entire process until a Contract is Awarded by the Region;

“ECA” means the Electronic Commerce Act, 2000, S.O. 2000, c. 17;

“Goods” means material, furniture, merchandise, equipment, stationery and other supplies and goods, including any incidental services;

“HST” means taxes payable under the *Excise Tax Act*, R.S.C. 1985, c.E-15, or any tax that replaces HST;

“Irrevocability Period” means the duration in which the Bid shall remain irrevocable and open to Award by the Owner and is the duration indicated in the Supplementary Instructions to Bidders;

“Letter of Intent” means the letter sent by the Region to a Bidder following the Bid review period, indicating the Region’s intent to Award subject to Senior Management and/or Regional Council approval, the Bidder’s fulfilment of the requirements of the Request for Tender, and formal execution of the Agreement between the Bidder and the Region;

“Notice of Award Letter” means the letter sent by the Region to the successful Bidder confirming the Award of the Contract and will include direction to commence Work;

“Owner”, “Region”, “Halton” and “Halton Region” means The Regional Municipality of Halton;

“Plan Taker” means one who downloads documents associated with the bid opportunity via the Bidding System;

“Product” or “Products” means material, machinery, equipment, and fixtures forming part of the Work, but does not include Construction Equipment;

“Proper Invoice” means a Proper Invoice, submitted by the Contractor, as defined in section 6.1 of the Act and the Region’s Contract Documents;

“Ready-for-Takeover” shall have been attained when the conditions set out in paragraph 12.1.1 of GC 12.1 – READY-FOR-TAKEOVER have been met, as verified by the Consultant pursuant to paragraph 12.1.4.2 of GC 12.1 – READY-FOR-TAKEOVER;

“Request for Tenders” or “RFT” means a procurement solicitation that includes commercial terms with clearly defined scope of Goods, Services and/or Construction where cost is the primary evaluation criterion when making an Award;

“Schedule of Prices” means the schedule supplied as part of the Request for Tender for the purposes of inputting pricing for the Work, which shall be completed by the Bidder and submitted back to the Region in its entirety through the Bidding System. Any reference in the Contract Documents to Bid Form shall be deemed to refer to Schedule of Prices;

“Services” means a non-physical, intangible Product resulting from a Vendor’s performance that cannot be stored or transported and that comes into existence at the time it is bought or consumed;

“Specifications” means that portion of the Contract Documents, wherever located and whenever issued, consisting of the written requirements and standards for Products, systems, workmanship, quality, and the services necessary for the performance of the Work;

“Supplementary Instructions to Bidders” means amendments to the Instructions to Bidders, issued as a separate document, which describe instructions unique to the Region and/or a particular Project;

“Suspension” means that, for the specified duration of the Suspension, the Suspended Vendor will not be permitted to participate in any procurement solicitations, as a Vendor or subcontractor, including prequalification processes, issued by the Region and “Suspend” and “Suspended” have corresponding meaning;

“Total Bid Price” means the price stipulated in the Schedule of Prices in the Bidding System;

“Vendor” means any legal person or entity providing or interested in providing Goods, Services and/or Construction, including suppliers, contractors, consultants and other service providers;

“Vendor Code of Conduct” means the Region’s Vendor Code of Conduct as available on the Region’s website at www.halton.ca;

“Vendor Performance Management Policy” means the policy outlining the Region’s process for evaluating Vendor performance of Contracts and the consequences resulting from “Unacceptable” performance, as may be amended from time to time;

“Work” has the meaning indicated in the Contract Documents.

2. ANY COMMUNICATIONS

2.1 Any questions regarding this Request for Tenders are to be submitted in writing through Halton Region’s Public Procurement Website (<https://haltonregion.bidsandtenders.ca>) by using the “Submit a Question” link associated with this bid request. Questions or clarification requests received by telephone or e-mail will not be accepted. Questions are to be submitted no later than the date indicated in the Supplementary Instructions to Bidders.

2.2 The Region reserves the right to neither accept nor consider any questions received after 4:00 P.M on the date indicated on the Supplementary Instructions to Bidders. The Region will review all questions received and prepare a response that is made available as an Addendum, if necessary, to all Plan Takers.

- 2.3 It will be the Bidder's responsibility to clarify with the Region any questions arising from this Request for Tenders or any matter they consider unclear in accordance with this section before submitting their Bid. Under no circumstances shall Bidders rely upon any information or instructions from the Region, its employees, or its agents, unless the information or instructions are provided in writing in the form of an Addendum.
- 2.4 A Bidder or its representative(s) will only communicate with the Designated Sourcing Representative for the Bid. A Bidder or its representative(s) shall not communicate with any other Regional staff or elected officials from the time of issuance of this Request for Tenders until the final Award. The Region reserves the right to disqualify any Bidder who contravenes this prohibition.
- 2.5 A Bidder or its representative(s) shall not threaten, harass nor intimidate staff, elected officials or any other supplier from bidding on a Regional solicitation or performing a Regional Contract. The Region reserves the right to disqualify any Bidder who contravenes this prohibition.

3. REGISTERED PLAN TAKER

- 3.1 Bid documents are available online via the Bidding System at <https://haltonregion.bidsandtenders.ca>. A Vendor that subscribes to the Bidding System can login to their account to purchase and download the bid document(s) without the preview watermark. A Vendor that does not subscribe to the Bidding System may choose to purchase a one-time only download of this bid opportunity. Bid documents are only available via the Bidding System and will not be provided in any other format.
- 3.2 All Bidders shall have a Bidding System account and be registered as a Plan Taker for this bid opportunity, which will enable the Bidder to download the bid document without the watermark preview, to receive Addenda/Addendum email notifications, download Addenda and to submit their Bid electronically through the Bidding System. To ensure receipt of the latest information and updates via email regarding this bid, the onus is on the Bidder to create a Bidding System account and register as a Plan Taker for the bid opportunity.
- 3.3 Bidders must be registered as a Plan Taker for this bid opportunity on the Bidding System in order to submit a Bid. Should the Region receive a Bid that is subsequently found to be from a Bidder that is not a registered Plan Taker, the Region reserves the right to remove the Bid from further consideration.

4. ELECTRONIC BID SUBMISSION ONLY

- 4.1 Bids shall be submitted via the Bidding System no later than the Closing Date and Closing Time specified in the Supplementary Instructions to Bidders.
- 4.2 **Only Bids submitted via the Bidding System will be accepted.** Bids submitted by any other method or format will be automatically rejected. It is the sole

responsibility of each Bidder to make sure that their Bid is delivered and received by the Bidding System by the Closing Date and Closing Time. Bids received after the specified Closing Date and Closing Time will not be accepted by the Bidding System.

- 4.3 There will not be a public Bid opening. When the Bids are opened, the unofficial bid results will be posted on the Bidding System at <https://haltonregion.bidsandtenders.ca>.
- 4.4 Bidders are cautioned that the timing of their Bid submission is based on when the Bid is successfully received by the Bidding System, not when a Bid is submitted by a Bidder, as Bid transmission can be delayed for a number of reasons, including the file transfer size, transmission speed, etc.
- 4.5 The Region shall not be liable for any costs, expenses, loss or damage resulting from any technical difficulty with the Bidding System, including, without limitation, computer system failures of either the Bidder or the Region's Bidding System service provider, a power failure, delays caused by internet/network traffic and/or failure of any computer system element.
- 4.6 For the above reasons, the Region recommends that Bidders allow sufficient time to upload their Bid and attachment(s) (if applicable). The Closing Date and Closing Time shall be determined by the clock used by the Bidding System.
- 4.7 The Region also encourages Bidders to take advantage of the Bidding System feature that allows Bidders to view their uploaded documents prior to submission of their Bid. Bidders are solely responsible for ensuring that they can access the Bidding System and submit their Bid before the Closing Date and Closing Time.
- 4.8 The Bidding System will send a confirmation email to the Bidder advising that their Bid was submitted successfully. If you do not receive a confirmation email, contact technical support at Bids & Tenders via telephone at 1-800-594-4798 or email: support@bidsandtenders.ca.

5. OMISSIONS, DISCREPANCIES AND INTERPRETATIONS IN REGION'S DOCUMENT (ADDENDUM)

- 5.1 Should a Bidder find omissions from or discrepancies in any Contract Documents or be in doubt as to the meaning or any part of the Contract Documents, the Bidder shall immediately notify the Region in writing.
- 5.2 Through Addendum, the Manager, Strategic Sourcing may:
 - a) revise, delete, add to or substitute any part of the Bid Documents;
 - b) extend the Closing Date; or
 - c) provide a written explanation or interpretation of this Request for Tenders.

- 5.3 No oral explanation or interpretation by the Region shall modify any of the requirements or provisions of the Bid Documents.
- 5.4 Bidders are advised that Addenda will be posted at <https://haltonregion.bidsandtenders.ca> under the applicable bid call.
- 5.5 The Bidding System will attempt to notify each Plan Taker by email, of the issuance of an Addendum to the Bid Documents. The Bidding System will use the email address supplied by the Plan Taker at the time of purchase of the Bid Documents. The Region will not be responsible for missing or invalid email addresses.
- 5.6 It is the Bidder's responsibility to view and/or download all applicable Addenda prior to submitting a Bid. Addenda form part of the Bid Documents and must be taken into consideration when submitting a Bid.
- 5.7 Bidders shall acknowledge receipt of any Addenda when submitting their Bid through the Bidding System. Bidders shall check a box for each Addendum/Addenda and any applicable attachments that have been issued before a Bidder can submit their Bid.
- 5.8 It is the responsibility of the Bidder to ensure they have received all Addendum/Addenda that have been issued. Bidders should check online at <https://haltonregion.bidsandtenders.ca> prior to submitting their Bid to confirm all Addendum/Addenda have been received.
- 5.9 If a Bidder submits their Bid at any time prior to the Closing Date and Closing Time and an Addendum/Addenda is subsequently issued by the Region after the submission of the Bid, the Bidding System will automatically **WITHDRAW** the Bid submission and change the Bid submission to an **INCOMPLETE STATUS**. A Bid with an incomplete status will **NOT be accepted by the Region**. The withdrawn Bid can be viewed by the Bidder in the **"MY BIDS"** section of the Bidding System. The Bidder is solely responsible to:
- a. Make any required adjustments to their Bid;
 - b. Acknowledge the Addendum/Addenda; and
 - c. Ensure that the re-submitted Bid is successfully received by the Bidding System no later than the Closing Date and Closing Time.

6. WITHDRAWAL OR REVISION OF BIDS

- 6.1 Bidders may edit or withdraw their Bid submission through the Bidding System prior to the Closing Date and Closing Time. If the Bidder wishes to re-submit a Bid, the Bidder is solely responsible to:
- a. Make any required adjustments to their Bid;
 - b. Acknowledge the Addendum/Addenda; and

- c. Ensure the re-submitted Bid is successfully received by the Bidding System no later than the Closing Date and Closing Time.
- 6.2 Requests to withdraw Bids received by the Bidding System will not be considered after the Closing Date and Closing Time.

7. PRE-BID MEETING, SITE VISIT AND SITE CONDITIONS

- 7.1 Bidders are responsible to conduct any site examinations deemed necessary by the Bidder for the proper preparation of a Bid and/or to make themselves aware of all conditions that may affect the Work. Nothing in this Request for Tenders shall relieve the Bidders from undertaking all investigation and clarification on all matters related to this Request for Tenders. No allowance will be made for additional costs nor will any claim be considered in connection with conditions or circumstances that could have been reasonably ascertained by the Bidders had reasonable efforts been made prior to the Closing Date and Closing Time.
- 7.2 If a pre-bid meeting and site visit is required, details will be provided in the Supplementary Instructions to Bidders.
- 7.3 General Instructions for pre-bid meetings and site visits:
- 7.3.1 The site meeting will begin promptly at the designated time. Bidders are encouraged to arrive prior to the time indicated in order to sign in.
 - 7.3.2 Attendees will be provided with an overview of the project. It is the responsibility of each Bidder to conduct a sufficient investigation of the site(s) and of the Work and obtain all required information about local conditions to be met with during the Work prior to submitting their Bid. The Bidders shall make their own estimates and measurements of the facilities and difficulties that may be encountered. Bidders may not claim at any time after submission of the Bid that there was any misunderstanding of the terms and conditions of the Contract relating to site conditions evident or apparent during the Bid period.
 - 7.3.3 The Region will not be held responsible for a Bidder's failure to obtain such information in section 7.3.2. The Region assumes no responsibility and will not pay additional costs for any omissions in the bid submission as a result of site-specific conditions that Bidders could have seen if they visited the site(s).
 - 7.3.4 It is the responsibility of the Bidder to verify actual site conditions and measurements. The price submitted is for the completed Work, including all items which may not have been mentioned but are required to complete the scope of Work.
- 7.4 Mandatory Site Meeting Instructions (where applicable):

- 7.4.1 Where there is a mandatory site meeting(s), Bidders who fail to attend and register their attendance at the mandatory site meeting(s) will be disqualified from submitting a Bid.
- 7.4.2 At the Region's discretion, a Bidder that arrives late to the mandatory site meeting(s) may be disqualified from submitting a Bid.
- 7.5 Non- Mandatory Site Meeting Instructions (where applicable):
 - 7.5.1 Where there is a non-mandatory site meeting(s), Bidders are not required to attend the site meeting(s) in order to submit a Bid. However, the Region strongly recommends that Bidders attend the site meeting(s) in order to familiarize themselves with the existing conditions prior to submitting their Bid.

8. SCHEDULE OF PRICES & TOTAL BID PRICE

- 8.1 Bidders shall complete and submit the Schedule of Prices through the Bidding System.
- 8.2 The Total Bid Price shall be in Canadian Dollars and shall include the furnishing of all materials, supplies and equipment and the provision of all labour, construction tools and equipment, utility and transportation services necessary to perform and complete all the Work required under the Contract, including all miscellaneous Work, whether specifically included in the Contract Documents or not. Goods and Services rendered will be billed to actual expenses, in accordance with the rates as Bid.
- 8.3 The Total Bid Price does not include HST.
- 8.4 It is the intention of the Contract Documents to provide finished Work. Any items omitted therefrom which are clearly necessary for the completion of the Work or its appurtenances shall be considered a portion of the Work though not directly specified and/or shown or called for in the Contract Documents and shall be included in the Total Bid Price.
- 8.5 Failure to complete any part of the Schedule of Prices or to provide all requested information may result in a Bid being declared non-compliant.

9. KEY CONSTRUCTION MILESTONES

- 9.1 Refer to the Supplementary Instructions to Bidders for key construction milestones including the commence work date, the Ready-for-Takeover date, and the completion date.

10. ONTARIO HARMONIZED SALES TAX (HST)

- 10.1 The Contractor will be required to provide the Region with its HST registration number and indicate the applicable HST on each progress payment certificate.
- 10.2 Where a change in Canadian Federal or Provincial taxes occurs after a Bid Closing Date, the Region shall adjust progress payment certificates to account for the exact amount of the tax change.

11. BID SECURITY

- 11.1 Bidders shall upload to the Bidding System the following: Bid Security in the amount of no less than **5 (five) percent of the Total Bid Price plus HST** in the following form:
 - 11.1.1 A **digital bid bond** in an electronically verifiable and enforceable (e-Bond) format, in the form CCDC 220 – 2024 naming “The Regional Municipality of Halton” as obligee and issued by a surety licensed to conduct surety and insurance business in Canada or in Ontario, in the amount set out in Section 11.1. **The digital bid bond form is included in Appendix “A” to this Instructions to Bidders.**
 - 11.1.2 The version submitted by the Bidder must be verifiable by the Region with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; all digital seals; with the surety, or an approved verification service provider of the surety.
 - 11.1.3 The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the Region, and in a single file. Allowable formats include pdf.
 - 11.1.4 The verification may be conducted by the Region immediately or at any time during the life of the bond and at the discretion of the Region with no requirement for passwords or fees.
 - 11.1.5 The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Item 11.1.2.
- 11.2 A scanned PDF copy of bonds, original certified cheque, bank draft, money order or any other format other than a digital bid bond is not acceptable and shall be rejected.
- 11.3 A digital bid bond failing the verification process will NOT be considered to be valid.
- 11.4 A digital bid bond passing the verification process will be treated as original and authentic.

- 11.5 Bidders shall upload their Bid Security to the Bidding System, labelled as “**Digital Bid Bond**”. All instructions and details for assessing authentication shall be included with the digital bid bond uploaded in the Bidding System.
- 11.6 The digital bid bond will not be returned to the Bidder.
- 11.7 The Bid Security shall be valid and not expire for at least the duration of the Irrevocability Period. In the event the Irrevocability Period is extended in accordance with section 18 of the Instructions to Bidders, the Bidder shall secure from its surety an extension of the Bid Security and provide evidence of same, which may be in the form of a rider to the Bid Security or some other form of written communication from the surety.

12. PERFORMANCE SECURITY, LABOUR & MATERIAL SECURITY

Agreement to Bond

- 12.1 Bidders shall upload to the Bidding System evidence that if awarded the Contract the Bidder will provide the **performance bond** required by the Contract. Such evidence shall be in the following form:

12.1.1 Where the Total Bid Price is equal to or greater than \$500,000 a **digital agreement to bond** in an electronically verifiable and enforceable (e-Bond) format issued by a surety licensed to conduct surety and insurance business in Canada or in Ontario for a **performance bond** in the Form 32 Performance Bond under section 85.1 of the Act, in the amount of fifty percent (50%) of the Total Bid Price (plus HST). The agreement to bond shall remain valid and not expire for at least the duration of the Irrevocability Period. In the event the Irrevocability Period is extended in accordance with section 18 of the Instructions to Bidders (the “Extended Irrevocability Period”), the Bidder shall secure from its surety an extension of the agreement to bond and provide evidence of same, which may be in the form of a rider to the agreement to bond or some other form of written communication from the surety. **The digital agreement to bond form is included in Appendix “B” to this Instructions to Bidders.**

- 12.2 Bidders shall upload to the Bidding System evidence that if awarded the Contract the Bidder will provide the **labour & material payment bond** required by the Contract. Such evidence shall be in the following form:

12.2.1 Where the Total Bid Price is equal to or greater than \$500,000, a **digital agreement to bond** in an electronically verifiable and enforceable (e-Bond) format issued by a surety licensed to conduct surety and insurance business in Canada or in Ontario for a **labour & material payment bond** in the Form 31 Labour and Material Payment Bond under section 85.1 of the Act, in the amount of fifty percent (50%) of the Total Bid Price (plus HST). The agreement to bond shall remain valid and not expire for at least the duration of the Irrevocability Period. In the event the Irrevocability

Period is extended in accordance with section 18 of the Instructions to Bidders (the “Extended Irrevocability Period”), the Bidder shall secure from its surety an extension of the agreement to bond and provide evidence of same, which may be in the form of a rider to the agreement to bond or some other form of written communication from the surety. **The digital agreement to bond form is included in Appendix “B” to this Instructions to Bidders.**

- 12.3 Bidders shall upload the digital Agreement to Bond described in sections 12.1 and 12.2 of the Instructions to Bidders (collectively the “**Digital Agreement to Bond Performance Security and Labour & Material Security**”) to the Bidding System, labelled as “**Digital Agreement to Bond**”. All instructions and details for assessing authentication shall be included with the digital agreement to bond uploaded in the Bidding System.

Agreement to Bond Requirements

- 12.4 The digital agreement to bond performance security and labour & material security shall be in the form as provided in Appendix “B” and shall include an express acknowledgement from the surety that a digitally signed and sealed performance bond and a digitally signed and sealed labour & material payment bond delivered to the Region by electronic means are:
- 12.4.1 permitted under the ECA;
 - 12.4.2 binding on the surety;
 - 12.4.3 enforceable in accordance with their terms and enforceable in law;
 - 12.4.4 for the purposes of any applicable statutory or common laws, regulations or guidelines, deemed to be originals hand delivered to the Region; and
 - 12.4.5 on the basis of the forgoing, the surety acknowledges and agrees that it would be estopped from and covenant not to challenge the enforceability of the bonds on the basis that each are digitally signed and sealed and delivered to the Region by electronic means.
- 12.5 The version submitted by the Bidder must be verifiable by the Region with respect to the totality and wholeness of the digital agreement to bond performance security and labour & material security form, including: the content; all digital signatures; all digital seals; with the surety, or an approved verification service provider of the surety.
- 12.6 The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the Region, and in a single file. Allowable formats include pdf.
- 12.7 The verification may be conducted by the Region immediately or at any time during the life of the digital agreement to bond performance security and labour & material security and at the discretion of the Region with no requirement for passwords or fees.

- 12.8 The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Item 12.5.
- 12.9 A scanned PDF copy of an agreement to bond, or any other format other than a digital agreement to bond is not acceptable and shall be rejected.
- 12.10 An agreement to bond failing the verification process will NOT be considered to be valid.
- 12.11 An agreement to bond passing the verification process will be treated as original and authentic.
- 12.12 The digital agreement to bond performance security, labour & material security will not be returned to the Bidder.

Performance and Labour & Material Payment Bonds

- 12.13 Where the Contract Price is equal to or greater than \$500,000, prior to the execution of the Contract, the accepted Bidder will be required to provide a Form 32 Performance Bond, under section 85.1 of the Act, in the amount of fifty percent (50%) of the Total Bid Price (including HST) (“**Performance Bond**”), and a Form 31 Labour and Material Payment Bond under section 85.1 of the Act in the amount of fifty percent (50%) of the Total Bid Price (including HST) (“**Labour & Material Bond**”) to guarantee the faithful performance of the Contract.
- 12.14 The Performance Bond and Labour & Material Payment Bond shall be submitted to the Region in one of the following forms:
 - 12.14.1 Certified originals, issued in triplicate-; or
 - 12.14.2 An electronically verifiable and enforceable (e-Bond) format issued by a surety licensed to conduct surety and insurance business in Canada or in Ontario, that meets the requirements as outlined in sections 12.16 of the Instructions to Bidders.
- 12.15 The Performance Bond and Labour and Material Payment Bond shall be in the prescribed form under the Act, using the current version of the form. The necessary information will be inputted into the forms after Bid closing and sent to the selected Bidder with the Letter of Intent. Changes to the prescribed forms under the Act will not be accepted.

Digital Performance Bond and Labour and Material Payment Bond Requirements

- 12.16 The Performance Bond and Labour and Material Payment Bond issued in an electronically verifiable and enforceable (e-Bond) format in accordance with Section 12.14.2 shall be delivered by email transmission to the Regional Project Manager and shall satisfy and be subject to the following requirements:

- 12.16.1 The version submitted by the selected Bidder must be verifiable by the Region with respect to the totality and wholeness of the Performance Bond and Labour & Material Payment Bond, including: the content; all digital signatures; all digital seals; with the surety, or an approved verification service provider of the surety.
- 12.16.2 The version submitted by the selected Bidder must be viewable, printable and storable in standard electronic file formats compatible with the Region, and in a single file. Allowable formats include pdf.
- 12.16.3 The verification may be conducted by the Region immediately or at any time during the life of the Performance Bond and Labour & Material Payment Bond and at the discretion of the Region with no requirement for passwords or fees.
- 12.16.4 The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Section 12.16.1.
- 12.16.5 A scanned PDF copy of Performance Bond and Labour & Material Payment Bond or any other format other than the formats provided for in Sections 12.14.1 and 12.14.2 are not acceptable and shall be rejected.
- 12.16.6 A Performance Bond and Labour & Material Payment Bond failing the verification process will NOT be considered to be valid.
- 12.16.7 A Performance Bond and Labour & Material Payment Bond passing the verification process will be treated as original and authentic.

13. VENDOR CODE OF CONDUCT

- 13.1 The Vendor Code of Conduct, as included in the Bid Documents, sets out the principles applicable to Vendors that wish to establish and maintain a business relationship with the Region.
- 13.2 The Region intends to do business with Bidders that demonstrate solid business integrity that aligns with the Region's core values and high standards of ethical behaviour expected by the Region. The Vendor Code is not to be read in lieu of, but in addition to obligations as set out in any agreements with the Region. Bidders are responsible to familiarize themselves with the Vendor Code of Conduct and comply with it. Bidders are to complete, sign and return the Vendor Code of Conduct Acknowledgement Form with their Bid submission.

14. BID IRREGULARITIES

- 14.1 Irregularities in connection with any Bid shall be resolved in accordance with Regional policies and procedures governing bid irregularities.

15. PRIVILEGE CLAUSE

- 15.1 The Region shall have the right to reject any or all Bids. The Bid with the lowest Total Bid Price will not necessarily be accepted. The Region reserves the right to accept all or part of any Bid.
- 15.2 The Manager, Strategic Sourcing may cancel the Request for Tenders at their sole discretion.
- 15.3 In addition to any other right expressed or implied, the Region reserves the right to:
- a) make public the names of any or all Bidders and members of a Bidder's team;
 - b) check references other than those provided by any Bidder;
 - c) disqualify or invalidate any Bid that contains material misrepresentations or any other materially inaccurate or misleading information;
 - d) make changes, including substantial changes, to this Request for Tenders provided that those changes are issued by way of Addenda;
 - e) if a single Bid is received, reject the Bid of the sole Bidder and cancel this Request for Tenders process or enter into direct negotiations with the sole Bidder.
- 15.4 The Region shall not be responsible for any liabilities, costs, expenses, loss or damage incurred, sustained or suffered by any Bidder by reason of the acceptance or the non-acceptance of the Bid, delay in Awarding the Contract, or cancellation of the Request for Tenders.
- 15.5 The Region, in its sole discretion, may reject a Bid from a Suspended Vendor and/or a Bid that includes a Suspended Vendor as a sub-contractor, in accordance with the Vendor Performance Management Policy.

16. TIED BIDS

- 16.1 In the event that two or more Bidders have exactly the same Total Bid Price, the Region shall have the sole right to select the successful Bid. The Region may, at its sole option, conduct a coin toss in the presence of the two (2) Bidders to select the successful Bid. The Region shall determine the manner and rules that shall govern the coin toss.

17. CLAIMS OR LITIGATION

- 17.1 The Region reserves the right, and in its absolute discretion after considering the criteria outlined in subsection 17.2, to reject a Bid submitted by a Bidder if the Region is engaged in legal action dispute including but not limited to a contractual claim and/or legal action against the Bidder, or, if the Bidder or any officer or director of the Bidder is engaged, either directly or indirectly through a corporation or personally, in a legal action dispute, including but not limited to a contractual claim and/or legal action against the Region, its elected representatives, appointed officers, or employees, in relation to:

- a. any other Contract, Goods or Services;
 - b. any matter arising from the Region's exercise of its powers, duties, or functions.
- 17.2 In determining whether or not to reject a Bid the Region will consider;
- a. whether the litigation is likely to adversely affect the Bidder's ability to work with the Region, its consultants and representatives; or,
 - b. whether the Region's experience with the Bidder indicates that the Region is likely to incur increased staff and legal costs in the administration of the Contract if it is Awarded to the Bidder; or,
 - c. whether the Bidder has been convicted of a criminal act against the Region or one of its local boards or corporations; or,
 - d. whether the Bidder has failed to satisfy an outstanding debt to the Region, including Provincial Offences Act fines, or one of its local boards or corporations; or,
 - e. there are reasonable grounds to believe it would not be in the best interests of the Region to enter into a Contract with the Bidder.

18. EXTENSION OF IRREVOCABILITY PERIOD

- 18.1 In the event the Region is unable to Award the Bid within the Irrevocability Period as set out in the Supplementary Instructions to Bidders, the Region shall request a formal extension in writing from one or more Bidders.
- 18.2 Subject to agreement by the Bidder(s) in writing, the Irrevocability Period shall be extended and the Bid Documents shall be considered automatically amended to reflect the revised Irrevocability Period.

19. CONTRACT EXECUTION

- 19.1 Where the Contract Price is more than \$250,000 (excluding HST), the Agreement to be executed by the parties shall be in the form provided in Appendix "C" to this Instructions to Bidders. This Agreement is a template only; the necessary information will be inserted into the Agreement after Bid closing and provided to the selected Bidder. Where the Contract Price is equal to or less than \$250,000 (excluding HST) the selected Bidder shall execute the Notice of Award. A Letter of Intent and the Contract Documents will be sent to the selected Bidder. The Bidder shall fully execute and return the Contract Documents together with the applicable Bonds (if required), Certificates of Liability Insurance, Workplace Safety and Insurance, New/Change Vendor & Electronic Funds Transfer Application (if required), and any other required documents to the Region within ten (10) calendar days of the date of receipt of the Letter of Intent, failing which the Region reserves the right to retain the Bidder's Bid Security and not Award to the Bidder. The aforementioned documents shall be completed to the satisfaction of the Region with no errors and omissions.

19.2 The Letter of Intent does not constitute Award of the Contract. Award is subject to Senior Management and/or Regional Council approval, the Bidder's fulfilment of the requirements of the Request for Tender, such as the submission of the required documentation as set out in the Letter of Intent, which may include but is not limited to those items referenced in section 19.1, and formal execution of the Agreement or Notice of Award between the Bidder and the Region.

19.3 In the event the Region, in its sole discretion, allows an extension of time for the Bidder to submit the required documentation referenced in section 19.1, the Bidder shall not be entitled to an extension of Contract time or delay claims as a result of the Bidder's delay in submitting completed documentation.

20. VENDOR PERFORMANCE MANAGEMENT POLICY

20.1 Bidders shall refer to the Supplementary Instructions to Bidders to confirm the applicability of the Vendor Performance Management Policy (the "Policy") to the Contract upon Award.

20.2 If the Policy applies to the Awarded Contract:

- a) The Region will evaluate the Contractor's performance in accordance with the Policy and provide a written evaluation and record of the Contractor's performance of this Contract. The Contractor will be provided with regular feedback of its performance of a Contract, to confirm satisfactory or unacceptable performance as applicable, and the consequences of unacceptable performance as outlined in the Policy.
- b) The Policy may be amended from time to time, and the latest version of the Policy shall form part of this Contract.
- c) The Policy and the applicable evaluation form can be accessed on the Region's website at www.halton.ca.

21. SUBCONTRACTORS

21.1 Bidders must ensure they and any subcontractors they retain are in good standing with the Region, in accordance with the Policy. It is the responsibility of Bidders to review the Suspended Vendor List on www.halton.ca prior to submitting a Bid or retaining any subcontractors.

22. ELECTRONIC PAYMENT DEPOSIT

22.1 The Region strongly encourages payment to the Contractor through electronic payment deposit. The successful Bidder(s) is to provide the New/Change Vendor & Electronic Funds Transfer Application Form as part of the documentation required prior to Award. Bidders are not to include the form with their Bid submission.

22.2 If during the Contract term, there is any change to the direct deposit information, the Contractor shall submit a new form, which must be authorized by a signing officer, and a person with the ability to bind the corporation. The Region will verify any and all changes to the banking information with the Contractor prior to making any changes.

23. PROPER INVOICE REQUIREMENTS

23.1 The Contractor will be required to comply with the prompt payment provisions pursuant to Part I.1 of the Act and the Proper Invoice requirements set out in the Region's Contract Documents.

24. INTERIM ADJUDICATION

24.1 The Contractor will be required to comply with the construction dispute interim adjudication provisions pursuant to Part II.1 of the Act and the Region's Contract Documents.

25. INTELLECTUAL PROPERTY

25.1 All reports, plans, designs, and other documents to be produced by the Contractor to this Request for Tenders shall, on submission to the Region, become the property of the Region.

26. DIGITAL DRAWINGS

26.1 Should a Bidder choose to print any of the drawings supplied by the Region in a PDF format, to preserve the scale of the prints, the Bidder must disable all page scaling options during printing. The Region assumes no responsibility whatsoever for the Bidder's failure to properly print, including the failure to print to the proper scale, any drawings supplied by the Region.

26.2 It is the Bidder's sole responsibility to verify that all PDF drawings are printed without PDF scaling enabled by verifying the final PDF prints with the associated drawing scale references in the applicable drawings title block.

27. GREEN PROCUREMENT

Not Applicable

28. ONTARIANS REGULATION 191/11 – INTEGRATED ACCESSIBILITY STANDARDS

28.1 Pursuant to Ontario Regulation 191/11 under the Accessibility for Ontarians with Disabilities Act, 2005, the Region is required to incorporate accessibility design, criteria and features when procuring or acquiring goods, services or facilities, except where it is not practicable to do so.

28.2 When determining which bid will result in an Award the Region may, in its sole discretion and without limiting any of its other express or implied rights regarding the discretion to make an Award, consider whether the Goods, Services or facilities to be provided incorporate accessibility design, criteria and features.

29. NON-RESIDENT WITHHOLDING TAX

29.1 Should the Region make an Award to a non-resident Vendor, the Region shall under the *Income Tax Act*, R.S.C., 1985, c. 1 (5th Supp.), and the *Income Tax Regulations*, C.R.C., c.945, all as amended from time to time, withhold 15% (fifteen percent) from payments of fees, commissions, or other amounts paid to non-resident Vendors, in respect of Services rendered in Canada, in accordance with the above, for Services rendered in Canada. The Region is not required to withhold this amount under subsection 105(1) of the *Regulations*, if the non-resident Vendor obtains a waiver certificate from the Canada Revenue Agency prior to the commencement of the Contract.

30. FREEDOM OF INFORMATION

30.1 The information provided in response to this Request for Tenders is collected in accordance with the Region's Purchasing By-law No. 63-23, or as amended, and will be used for all purposes related to awarding the Bid and administering By-law No. 63-23. The Bidder acknowledges that the Region is subject to the *Municipal Freedom of Information and Protection of Privacy Act*, R.S.O 1990, c.M.25, as amended ("MFIPPA") and as a result the contents of any Bid submitted by the Bidder are public and that with the exception of personal information the Bid will be disclosed if the Region receives a request for it under MFIPPA.

APPENDIX "A"

BID BOND



CCDC 220 – 2024 'BID BOND'

No. Bond Amount \$

..... as principal, hereinafter called the Principal, and a corporation duly authorized to transact the business of Suretyship in as surety, hereinafter called the Surety, are held and firmly bound unto as obligee, hereinafter called the Obligee, in the amount of Dollars (\$) lawful money of Canada, for the payment of which sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS, the Principal has submitted a written bid to the Obligee, for (Name, Location or Address, and Project Number, if any):

The condition of this obligation is such that if the Principal shall have the bid accepted within the Validity Period and:

- a) Enters into a formal contract; and,
b) Gives such bond or bonds as may be specified in the Obligee's bid documents from a Surety duly authorized to transact the business of Suretyship in the jurisdiction of the project,

then this obligation shall be void. Otherwise, provided the Obligee takes all reasonable steps to mitigate the amount of such excess costs, the Principal and the Surety will pay to the Obligee the difference in money between the amount of the bid of the Principal and the amount for which the Obligee legally contracts with another party for the work, supplies and services which were specified in the said bid, if the latter amount be in excess of the former.

The "Validity Period" as used herein shall mean the time period prescribed in the Obligee's bid documents for acceptance of the bid, or, if no time period is specified in the Obligee's bid documents, sixty (60) calendar days from the closing date of the bid.

By agreement between the Principal and the Obligee, the Validity Period may be extended by up to sixty (60) calendar days without notice to the Surety. Further or longer extensions of the Validity Period require prior consent of the Surety.

The Principal and Surety shall not be liable for a greater sum than the Bond Amount.

It is a condition of this bond that any suit or action must be commenced within seven (7) months of the date of this Bond. In the province of Québec, the coverage period of this bond expires seven (7) months after the date of this Bond.

No right of action shall accrue hereunder to or for the use of any person or corporation other than the Obligee named herein, or the heirs, executors, administrators or successors of the Obligee.

The Surety:

(corporate name)
(address)
(fax)
(email)

The Obligee:

(proper name)
(address)
(fax)
(email)

The Principal:

(corporate name)
(address)
(fax)
(email)

IN WITNESS WHEREOF, the Principal and the Surety have Signed and Sealed this Bond dated day of in the year

SIGNED and SEALED in the presence of

ATTORNEY IN FACT

Principal

Signature

(name of person signing)

Surety

Signature

(name of person signing)

APPENDIX “B”

AGREEMENT TO BOND

We, the undersigned, hereby agree to become bound as Surety for _____ (hereinafter referred to as the Bidder) for a Performance Bond totalling fifty percent (50%) of the Total Bid Price (including HST) and for a Labour & Material Payment Bond totalling fifty per cent (50%) of the Total Bid Price (including HST) all conforming to the Contract Documents, for the full and due performance of the work shown as described therein and for the payment of all labour and materials and maintenance, if the Bid for the construction of

is accepted by The Regional Municipality of Halton.

It is a condition of this Agreement to Bond that if the above-mentioned Bid is accepted, the undersigned will supply the above-specified bonds within ten (10) days from the day upon which notification of selection of the Bid is given.

This Agreement to Bond shall remain valid for the duration of the Irrevocability Period as set out in the Supplementary Instructions to Bidders.

The surety acknowledges that a digitally signed and sealed Performance Bond and Labour & Material Bond delivered to the Region by electronic means are:

- i. permitted under the *Electronic Commerce Act, 2000*, S.O. 2000, c. 17;
- ii. binding on the surety;
- iii. enforceable in accordance with the surety’s terms and enforceable in law;
- iv. for the purposes of any applicable statutory or common laws, regulations or guidelines, deemed to be originals hand delivered to the Region; and
- v. on the basis of the forgoing, the surety acknowledges and agrees that it would be estopped from and covenants not to challenge the enforceability of the bonds on the basis that each are digitally signed and sealed and delivered to the Region by electronic means.

DATED this ____ day of _____, 20

Name of Surety Company

Signature of Authorized Person Signing for Company

(Company Seal)

Title

NOTE: Surety must be licensed to conduct surety and insurance business in Canada or in Ontario, satisfactory to the Region in its reasonable discretion.

APPENDIX "C"

AGREEMENT BETWEEN OWNER AND CONTRACTOR

AGREEMENT BETWEEN OWNER AND CONTRACTOR
For use when a stipulated price is the basis of payment.

This Agreement made on [] day of [] in the year []
by and between the parties

[Redacted]

hereinafter called the "Owner"

and

[Redacted]

hereinafter called the "Contractor"

The Owner and the Contractor agree as follows:

ARTICLE A-1 THE WORK

The Contractor shall:

1.1 perform the Work required by the Contract Documents for (insert below the description or title of the Work)

[Redacted]

located at (insert below the Place of the Work)

[Redacted]

for which the Agreement has been signed by the parties, and for which (insert below the name of the Consultant)

[Redacted]

is acting as and is hereinafter called the "Consultant" and

1.2 do and fulfill everything indicated by the Contract Documents, and

1.3 commence the Work by the [] day of [] in the year [] and, subject to adjustment in Contract Time as provided for in the Contract Documents, attain Ready-for-Takeover, by the [] day of [] in the year []

ARTICLE A-2 AGREEMENTS AND AMENDMENTS

2.1 The Contract supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the Work, including the bid documents that are not expressly listed in Article A-3 of the Agreement - CONTRACT DOCUMENTS.

2.2 The Contract may be amended only as provided in the Contract Documents.

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ARTICLE A-3 CONTRACT DOCUMENTS

3.1 The following are the *Contract Documents* referred to in Article A-1 of the Agreement – THE WORK:

- Agreement between *Owner* and *Contractor*
- Definitions
- General Conditions

*



* (Insert here, attaching additional pages if required, a list identifying all other Contract Documents e.g. supplementary conditions; Division 01 of the Specifications – **GENERAL REQUIREMENTS**; Project information that the Contractor may rely upon; technical Specifications, giving a list of contents with section numbers and titles, number of pages and date; material finishing schedule; Drawings, giving drawing number, title, date, revision date or mark; addenda, giving title, number, date; time schedule)

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ARTICLE A-4 CONTRACT PRICE

- 4.1 The *Contract Price*, which excludes *Value Added Taxes*, is:
[redacted] /100 dollars \$ [redacted]
- 4.2 *Value Added Taxes* (of [redacted] %) payable by the *Owner* to the *Contractor* are:
[redacted] /100 dollars \$ [redacted]
- 4.3 Total amount payable by the *Owner* to the *Contractor* for the *Work* is:
[redacted] /100 dollars \$ [redacted]
- 4.4 These amounts shall be subject to adjustments as provided in the *Contract Documents*.
- 4.5 All amounts are in Canadian funds.

ARTICLE A-5 PAYMENT

- 5.1 Subject to the provisions of the *Contract Documents* and *Payment Legislation*, and in accordance with legislation and statutory regulations respecting holdback percentages, the *Owner* shall:
 - 1 make progress payments to the *Contractor* on account of the *Contract Price* when due in the amount certified by the *Consultant* unless otherwise prescribed by *Payment Legislation* together with such *Value Added Taxes* as may be applicable to such payments,
 - 2 upon *Substantial Performance of the Work*, pay to the *Contractor* the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment, and
 - 3 upon the issuance of the final certificate for payment, pay to the *Contractor* the unpaid balance of the *Contract Price* when due together with such *Value Added Taxes* as may be applicable to such payment.
- 5.2 Interest
 - 1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by adjudication, arbitration or court, interest at the following rates on such unpaid amounts shall also become due and payable until payment:
 - (1) 2% per annum above the prime rate for the first 60 days.
 - (2) 4% per annum above the prime rate after the first 60 days.Such interest shall be compounded on a monthly basis. The prime rate shall be the rate of interest quoted by [redacted] (*Insert name of chartered lending institution whose prime rate is to be used*) for prime business loans as it may change from time to time.
 - 2 Interest shall apply at the rate and in the manner prescribed by paragraph 5.2.1 of this Article on the settlement amount of any claim in dispute that is resolved either pursuant to Part 8 of the *General Conditions – DISPUTE RESOLUTION* or otherwise, from the date the amount would have been due and payable under the *Contract*, had it not been in dispute, until the date it is paid.

ARTICLE A-6 RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

- 6.1 *Notices in Writing* will be addressed to the recipient at the address set out below.
- 6.2 The delivery of a *Notice in Writing* will be by hand, by courier, by prepaid first class mail, or by other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.
- 6.3 A *Notice in Writing* delivered by one party in accordance with this *Contract* will be deemed to have been received by the other party on the date of delivery if delivered by hand or courier, or if sent by mail it will be deemed to have been received five calendar days after the date on which it was mailed, provided that if either such day is not a *Working Day*, then the *Notice in Writing* will be deemed to have been received on the *Working Day* next following such day.
- 6.4 A *Notice in Writing* sent by any form of electronic communication will be deemed to have been received on the date of its transmission provided that if such day is not a *Working Day* or if it is received after the end of normal business hours on the date of its transmission at the place of receipt, then it will be deemed to have been received at the opening of business at the place of receipt on the first *Working Day* next following the transmission thereof.
- 6.5 An address for a party may be changed by *Notice in Writing* to the other party setting out the new address in accordance with this Article.

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In witness whereof the parties hereto have executed this Agreement by the hands of their duly authorized representatives.

SIGNED AND DELIVERED
in the presence of:

WITNESS

signature

name of person signing

OWNER

name of Owner

signature

name and title of person signing

WITNESS

signature

name of person signing

CONTRACTOR

name of Contractor

signature

name and title of person signing

N.B. Where legal jurisdiction, local practice or Owner or Contractor requirement calls for:
(a) proof of authority to execute this document, attach such proof of authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign the Agreement for and on behalf of the corporation or partnership; or
(b) the affixing of a corporate seal, this Agreement should be properly sealed.

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APPENDIX “D”

VENDOR CODE OF CONDUCT



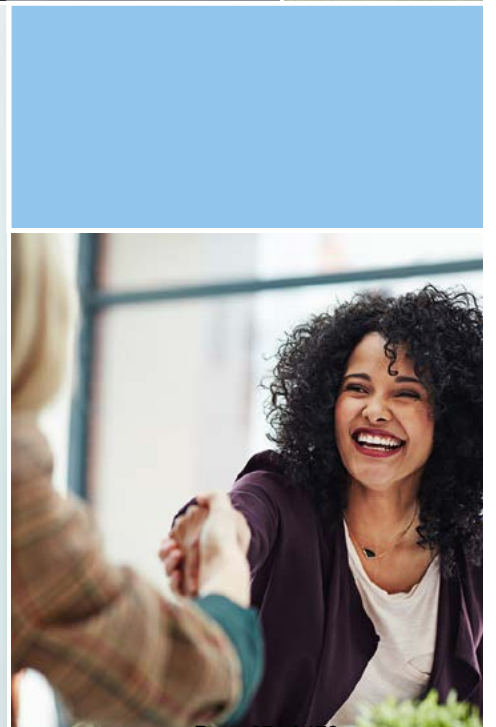
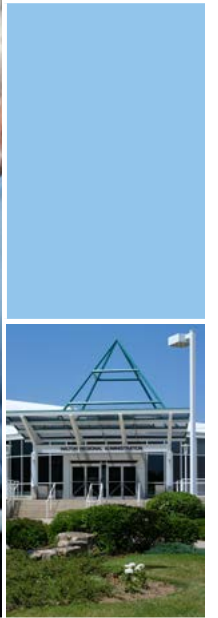
HALTON REGION Vendor Code of Conduct



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Introduction and Purpose

The Regional Municipality of Halton (herein after referred to as “The Region”) is committed to purchasing goods and services from responsible Vendors that provide quality goods and services at competitive prices. Vendors, subcontractors, employees, agents, bidders and potential bidders that provide goods and services to the Region (herein after referred to as “Vendors”) are expected to support the Region’s goals and objectives of encouraging competitive bidding, ensuring fairness, accountability and transparency in the procurement process, and obtaining the best possible value in the procurement of goods and services for the Region.

The Region expects Vendors to perform all duties in a competent and impartial manner that can withstand the closest public scrutiny. Vendors are expected to exercise good judgement when doing business with the Region. This Vendor Code of Conduct (herein after referred to as “Vendor Code”) sets out the principles applicable to Vendors that wish to establish and maintain a business relationship with the Region. The Region is confirming its intention to do business with Vendors that demonstrate solid business integrity that aligns with the Region’s core values and high standards of ethical behaviour. Vendors must also inform their employees and any sub-contractors or sub-vendors about this Vendor Code.

The Vendor Code is consistent with Halton Region’s Code of Conduct, which sets out the expectations for Regional staff. The Region’s Code of Conduct is available on the Region’s website.

The Vendor Code should not be read in lieu of, but in addition, to Vendors obligations as set out in any agreements between the Region and a Vendor. In the event of a conflict between this Code and an applicable agreement, the agreement shall govern.



Vendor Responsibilities

Vendors are required to familiarize themselves with this Vendor Code and comply with it as a condition of doing business with the Region. Vendors are expected to adhere to the following core principles of business integrity:

- a) uphold the laws of the Region, Ontario and Canada, and not be a party to their breach, evasion or subversion;
- b) treat all persons honestly and fairly, with proper regard for rights, entitlements, duties and obligations, and at all times act responsibly and diligently in the performance of their duties;
- c) be professional and courteous, and resolve any work-related disagreements in a responsible and expeditious manner;
- d) be accountable and responsible for their decisions and actions, take ownership of problems and initiate corrective actions;
- e) promote the health and safety of others and prevent workplace illness, injury, harassment and violence;
- f) carry out their duties in a fair, impartial and transparent manner;
- g) complete the Acknowledgment Form as set out in Appendix A; and
- h) report on non-compliance or suspected non-compliance of the Vendor Code.

These principles are also consistent with the Halton Region Code of Conduct.

i. Compliance with Laws

Vendors that wish to do business with the Region shall abide by all applicable laws and regulations including Federal, Provincial and Local laws regarding environmental matters, occupational health and safety, labour and employment practices, human rights, accessibility, immigration, product safety, shipping and product labelling. If Vendors become aware of any activities that are not in compliance with all applicable laws and regulations, they must report it immediately as specified in the non-compliance reporting section of this Vendor Code.

Vendors shall disclose:

- 1) any previous convictions of collusion, bribery, fraud or other similar practices prohibited under law for which they have not received a pardon; and
- 2) breach of the Region's Vendor Code or those of any other related Agencies or Corporation(s) of the Region.

Vendors are prohibited from misrepresenting their relevant past experiences and qualifications in relation to any solicitation process and acknowledge that the Region's process of evaluation may include information provided by the Vendor's references as well as records of past performance on previous contracts and services with the Region. The Region reserves its rights if the Vendor fails to make the appropriate disclosures and representations.





ii. Confidentiality and Privacy

Vendors may have access to confidential and/or personal information by reason of their duties and responsibilities with the Region. Confidential information is defined as any information that is proprietary, strategic, technical, business or personal and not available to the public. All Vendors must respect such information and ensure it is safeguarded from unauthorized disclosure or access. Confidential information must be protected in accordance with the Vendor Code of Conduct. Such information must only be used or disclosed in accordance with this Vendor Code of Conduct and the provisions of the *Municipal Freedom of Information and Protection of Privacy Act, 1990* and the *Personal Health Information Protection Act, 2004*.

Disclosure of information means making the information available to others, and should only occur where disclosure is necessary and proper in the discharge of the Region's functions or where the disclosure is required by law. This includes and protects any information that is, and should be considered as, internal information relating to Regional business.

Vendors must not disclose confidential and/or personal information unless specifically and explicitly permitted in the terms of their contract. The duty of a Vendor to maintain the integrity and confidentiality of Regional information continues once that Vendor ceases to be in a contract with the Region.

When discussing business matters, Vendors must consider their surroundings. Conversations in public places should be limited to information that is non-confidential and does not include references that could identify a person or situation.

iii. Information Security

Vendors must use information obtained through their relationship with the Region only for the purposes of the supply relationship. Vendors must store information securely and have in place appropriate information security policies and procedures. Vendors must notify the Region promptly of actual or suspected privacy breaches, security breaches or loss of Regional information.

iv. Social Media

The Region supports the use of online communications to enhance customer service and leverage the Region's brand. Vendors should not communicate on social media platforms on behalf of the Region unless the Vendor is expressly authorized in writing to do so by the Region. When such communication is authorized, it is to be conducted in a manner that is consistent and respectful of Canadian libel laws, *Municipal Freedom of Information and Protection of Privacy Act, 1990* and the Region's practices in regards to confidential information and intellectual property.

All Regional data or information obtained by the Vendor through the delivery of services or goods is to be considered proprietary and confidential. Without the Region's prior consent, Vendors should not communicate to social media platforms identifying the Region as a client and the associated services and goods provided to the Region. Regional consent must be obtained prior to identifying the Region as a client.





Integrity and Public Confidence

i. Conflict of Interest

Public confidence in the Region is put at risk when the conduct of a Vendor involves or appears to involve a conflict between public duty and private interests. Vendors are required to support and advance the interests of the Region and avoid placing themselves in situations where their personal interests actually or potentially conflict with the interests of the Region. Vendors shall disclose to the Region any situation that could result in an actual, apparent or perceived conflict of interest and the Regional employee that has an interest in the Vendor's business (or any other economic or family ties with the Vendor).

Vendors are expected, at minimum, to:

- a) base business decisions strictly on merit and the best interests of the Region in a manner consistent with their contractual obligations with the Region;
- b) avoid any situation that may create a real or perceived conflict of interest;
- c) not take part in, or in any way influence, any Regional decision that might result in a financial or other advantage, whether direct or indirect, as a result of the contractual association with the Region;
- d) not attempt to gain an improper advantage or preferential treatment from Regional employees; and
- e) provide no personal benefit to employees of the Region.

If Vendors become aware of any activities that may be considered a conflict of interest involving the Region, they must report it immediately as specified in the non-compliance reporting section of this Vendor Code.

ii. Business and Personal Relationships

Vendors shall not use or seek to use their association with the Region to receive direct or indirect benefit for themselves or their family members, friends and any other businesses or consultants that they or the Region do business with.

iii. Avoidance of Preferential Treatment

Vendors shall not grant preferential treatment to any Regional staff, their family and friends, or any businesses. Vendors must avoid creating or appear to create an obligation for the purpose of gaining any special consideration.

iv. Gifts and Hospitality

Accepting a gift, hospitality or other benefit from a Vendor could influence an employee's judgment and performance of official duties, or give the appearance of doing so, even if the employee believes the benefit will not affect their objectivity or impartiality. Vendors must not offer, directly or indirectly, any gift, hospitality or other benefits to the Region's staff. Gifts having a monetary value such as cash, gift certificates, loans, services, discounts and ticket(s) to an entertainment event including sporting events, concerts or other such related activities must not be offered. These requirements do not change during traditional gift-giving seasons.

Under no circumstances should a Vendor solicit gifts, hospitality and/or other benefits or transfers of economic value to Region staff. The same is expected of the Region staff—not to solicit gifts or other benefits from Vendors.

All Regional staff are subject to the rules governing the acceptance of gifts as outlined in Section 26.2.1 of Halton Region Purchasing By-law No. 63-23 and the Halton Region Code of Conduct.

Employees may accept common expressions of courtesy that do not cause suspicion about the objectivity and impartiality of the employee, would not compromise the integrity of the Region and:

- a) are of a nominal value not to exceed fifty (\$50);
- b) occur on infrequent and exceptional basis; and
- c) are not ticket(s) to an entertainment event including sporting events, concerts, or other such related activities.

Vendors must not place Regional employees in the difficult position of having to refuse gifts that would place them in conflict with the rules governing the acceptance of gifts outlined in this Vendor Code.





v. Political Activity

No Vendor shall engage in political activity on Regional property while carrying out the requirements of their contract for the Region. If Vendors become aware of any political activities, they must report it immediately as specified in the non-compliance reporting section of this Vendor Code.

vi. Fraud

The Region is committed to the highest standards of corporate accountability, transparency, responsibility and integrity. The Region will protect funds, property, information and other assets owned by or in the care of the Region through the prompt investigation of any alleged fraudulent conduct.

Vendors must not engage in any fraudulent activity. Examples of activities which may be considered fraudulent include, but are not limited to:

- a. forgery or alteration of documents (cheques, purchase orders, time sheets, etc.);
- b. misappropriation of funds, securities, supplies or assets;
- c. authorization or receipt of payment for goods not received, services not performed or hours not worked;
- d. any claim for reimbursement of expenses that were not incurred for the exclusive benefit of the Region;
- e. authorization of unjustified or inflated change order requests to increase profits;
- f. knowingly delivering works, goods or services that do not meet contract specification; and
- g. subcontracting to business entities that are not arm's length without prior consent of the Region.

If Regional Vendors, their employees, associates or other third parties become aware of any activities that may be considered fraudulent, they must report it immediately as specified in the non-compliance reporting section of this Vendor Code.

vii. Theft and Vandalism

The Region's assets must be protected from theft, destruction, vandalism and neglect, and used properly and strictly for the Region's purposes. Vendors' personal use, misuse, misappropriation of/or theft or vandalism of Regional property, resources, equipment, materials and supplies is prohibited.

viii. Anti-Bribery and Anti-Corruption

Vendors are expected to comply with applicable anti-corruption laws, whether domestic or foreign, including but not limited to the *Corruption of Foreign Public Officials Act, 1998* and the Criminal Code, and not engage in any form of corrupt practices including, but not limited to, extortion, fraud, bribery or other unlawful payment or benefit to secure any concession, contract or other favourable treatment.

Vendors should not engage in any conduct that would put the Region at risk of violating anti-bribery laws or regulations. Bribery is the giving or receiving of a “thing” of value to influence the actions of another person or organization.

Types of bribery can include, but are not limited to:

- a) kickback payments that could be received before, during or at the end of a project/contract; and
- b) any financial benefits given with the intent of influencing the recipient which includes such things as gifts (for example, travel or entertainment), loans, credit cards, purchase overpayments, cash, fees and commissions.

ix. Collusive Bidding

Vendors are not to participate in collusive bidding. Groups of bidders might secretly agree to submit complementary high bids to allow pre-selected Vendors to win contracts on a rotating basis, divide contracts by territory or take steps to defeat the competitive process and divide work. Vendors are not to contract with separate business entities that are not arm’s length, submit a bid through non arm’s length entity or reveal confidential information to an arm’s-length or non-arm’s length entity.

If Vendors, their employees, associates or other third parties become aware of any activities that may be considered bribery or collusive bidding, they must report it immediately as specified in the non-compliance reporting section of this Vendor Code.





Workplace Well-being

i. Respectful Workplace

The Region is committed to protecting the health and safety of all Regional employees and Vendors against illness, injury and incidents of violence and harassment. Every Vendor will make every effort to provide and maintain a safe and healthy work environment, as well as maintain a diverse and respectful workplace in which the dignity and self-respect of every person is valued.

Vendors must ensure that their personal conduct within the workplace and elsewhere does not adversely affect:

- a) their ability to perform their official duties;
- b) the ability of other Vendors to perform their duties; or
- c) public confidence in the Region or in the public sector.

ii. Accessibility for People with Disabilities

Vendors are required to have met compliance obligations in the *Accessibility for Ontarians with Disabilities Act, 2005* and Ontario Regulation 191/11-Integrated Accessibility Standards, as applicable.

iii. Employment Practices

Vendors must abide by applicable employment standards, labour, non-discrimination and human rights legislation. Where laws do not prohibit discrimination or where they allow for differential treatment, Vendors are expected to be committed to non-discrimination principles and operate in a way that does not differentiate unfairly.

iv. Impairment at Work

In order to minimize the risk of impaired performance due to substance use, the following are strictly prohibited for all Regional Vendors:

- use, possession, distribution, offering or sale of illegal drugs, illegal drug paraphernalia or un-prescribed drugs (for which a prescription is legally required in Canada) while on Regional business or premises;
- use, possession, distribution, offering or sale of alcoholic beverages or cannabis on Regional premises;
- intentional misuse of prescribed medications, over-the-counter medications or other substances while on Regional business or premises; and
- being unfit for work due to the effects or after-effects of alcohol, illicit or illegal drugs, un-prescribed drugs (for which a prescription is legally required in Canada) or the intentional misuse of medications or other substances.

Vendors are required to report to their Regional supervisor or project authority the use of any medication that may affect their ability to perform their job in a safe manner. Vendors have a responsibility to manage potential impairments during working hours due to the legitimate use of medications in consultation with their personal physician.

If Vendors, their employees, associates or other third parties become aware of any activities that may be considered impaired performance due to substance use, they must report it immediately as specified in the non-compliance reporting section of this Vendor Code.





Non-Compliance Reporting

Vendors must report any practices, behaviours, activities or actions believed to be in contravention or in conflict with this Vendor Code, Halton Region Code of Conduct or any other Regional policy.

The Region will resolve all complaints regarding violations of this Vendor Code to the greatest extent possible in a timely, respectful and confidential manner, and ensure all Vendors are held accountable for their actions.

All Vendors shall be free from reprisal, discipline, harassment or discrimination as a result of reporting, in good faith, a breach or suspected breach of this Vendor Code. If it is determined, however, that a complaint is frivolous, vexatious or malicious in nature, the complainant may be subject to action as outlined in the Penalty for Non-Compliance section of this Vendor Code.

During the investigation and resolution of complaints, all information, including the identity of the complainant and any other Vendors or Vendor staff involved, will remain confidential except where sharing information is otherwise required by law or required to further the investigation.

i. Complaint Resolution Procedure

EARLY RESOLUTION

Vendors who become aware of or have directly experienced an action which is in contravention of this Vendor Code should:

- a) keep a written record of the incidents, dates, time, locations, possible witnesses, any attempted resolutions and behaviours of the Vendor(s) involved; and
- b) report the breach to the Director of Supply Chain Management, who must investigate and attempt to resolve the complaint as expeditiously as possible, except in the case of suspected fraud, which is to be immediately reported to the Chief Internal Auditor as specified in the Formal Complaint Investigation section of this Vendor Code.

The Regional Municipality of Halton

Director of Supply Chain Management
1151 Bronte Road
Oakville ON L6M 3L1
905-825-6000 ext. 7231
Sam.Pringle@halton.ca

If the Director of Supply Chain Management is not able to resolve the complaint to the reporting Vendor's satisfaction, and/or the complaint involves the Director of Supply Chain Management, a complaint shall be filed directly to the Region's Chief Internal Auditor or to the Code of Conduct Help Line.

FORMAL COMPLAINT INVESTIGATION

- a) Complaints must be made in writing and signed by the complainant using a designated form. The form is available on the Region's website.
- b) Complaints must be forwarded to the Chief Internal Auditor, who will initiate an investigation into the complaint within five (5) business days of receipt.

The Regional Municipality of Halton

Chief Internal Auditor
1151 Bronte Road
Oakville ON L6M 3L1
905-825-6000 ext. 7532
Karen.Cinq-Mars@halton.ca

- c) Once the investigation is complete, the investigation findings and recommendations will be reported to the complainant and respondent, as appropriate and as determined by the Chief Internal Auditor.





ii. **Alternative Reporting – Confidential Code of Conduct Help Line**

A Vendor who does not feel comfortable reporting a complaint as outlined above may contact the Region's confidential and anonymous Vendor Code of Conduct Help Line (available 24/7) at:

- Toll-free telephone: 1-833-210-0001
 - Website: www.lighthouse-services.com/haltonvendor
 - Email: reports@lighthouse-services.com (must include Halton Region in the subject line)
- a) All complaints submitted to the Vendor Code of Conduct Help Line will be received by a third party who will relay the complaint, without revealing the caller's identity (if requested), to the Chief Administrative Officer.
 - b) The confidential complaint will be reviewed by the Chief Administrative Officer and the Director of Human Resources within five (5) business days of the initial review.
 - c) Once the investigation is complete, the investigation findings and recommendations will be reported to the complainant and respondent, as appropriate, if their identities are made known.

The Region does not guarantee that an investigation will be conducted for every complaint.

Penalty for Non-Compliance

Any vendor who contravenes the Vendor Code, including any provision of this Vendor Code, may be subject to:

- a) verbal or written warning;
- b) cancellation of business relationship and/or contract;
- c) disqualification from participating in future business opportunities; and/or
- d) such other action or penalty as may be appropriate and permitted by law in the circumstances of the particular contravention.

This Vendor Code may be modified from time to time by the Region at its discretion.



Acknowledgement Form

The attached Vendor Code of Conduct sets forth the principles required by the Regional Municipality of Halton (“the Region”) of all Vendors who supply goods and services to the Region when conducting business with the Region.

By signing this Acknowledgement, the undersigned Vendor agrees to abide by the Vendor Code of Conduct and also agree to ensure its employees, officers, agents, representatives, and subcontractors are also made aware of and comply with it.

ACKNOWLEDGEMENT

I, _____ an authorized representative of _____, hereby acknowledge and agree to abide by the attached Vendor Code of Conduct, and will ensure that the employees, officers, agents, representatives and subcontractors of _____ are aware of and abide by such policies and principles in the process of preparing and submitting bids and proposals for Regional work, provisions of goods and services to the Region, and during the performance of all agreements entered into with the Region for such purposes.

Submitted by:
(Please type/print)

Business Name

Street Address

City/Town

Postal Code

Telephone Number

Fax Number

Contact Email Address

Date

Signature of Signing Officer

Name and Title (please print)

Signature of Contact Person

Name and Title (please print)





CCDC 2

Stipulated Price Contract

2020

Name of Project

Apply a CCDC 2 copyright seal here. The application of the seal demonstrates the intention of the party proposing the use of this document that it be an accurate and unamended form of CCDC 2 – 2020 except to the extent that any alterations, additions or modifications are set forth in supplementary conditions.

CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE
CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE
CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE

CCDC 2 STIPULATED PRICE CONTRACT

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CCDC 2 is the product of a consensus-building process aimed at balancing the interests of all parties on the construction project. It reflects recommended industry practices. The CCDC and its constituent member organizations do not accept any responsibility or liability for loss or damage which may be suffered as a result of the use or interpretation of CCDC 2.

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AGREEMENT BETWEEN OWNER AND CONTRACTOR

For use when a stipulated price is the basis of payment.

This Agreement made on _____ **day of** _____ **in the year** _____ **by and between the parties**

hereinafter called the "Owner"

and

hereinafter called the "Contractor"

The *Owner* and the *Contractor* agree as follows:

ARTICLE A-1 THE WORK

The *Contractor* shall:

1.1 perform the *Work* required by the *Contract Documents* for *(insert below the description or title of the Work)*

located at *(insert below the Place of the Work)*

for which the Agreement has been signed by the parties, and for which *(insert below the name of the Consultant)*

is acting as and is hereinafter called the "*Consultant*" and

1.2 do and fulfill everything indicated by the *Contract Documents*, and

1.3 commence the *Work* by the _____ day of _____ in the year _____ and, subject to adjustment in *Contract Time* as provided for in the *Contract Documents*, attain *Ready-for-Takeover*, by the _____ day of _____ in the year _____.

ARTICLE A-2 AGREEMENTS AND AMENDMENTS

2.1 The *Contract* supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the *Work*, including the bid documents that are not expressly listed in Article A-3 of the Agreement – CONTRACT DOCUMENTS.

2.2 The *Contract* may be amended only as provided in the *Contract Documents*.

ARTICLE A-3 CONTRACT DOCUMENTS

3.1 The following are the *Contract Documents* referred to in Article A-1 of the Agreement – THE WORK:

- Agreement between *Owner* and *Contractor*
- Definitions
- General Conditions

*

** (Insert here, attaching additional pages if required, a list identifying all other Contract Documents e.g. supplementary conditions; Division 01 of the Specifications – GENERAL REQUIREMENTS; Project information that the Contractor may rely upon; technical Specifications, giving a list of contents with section numbers and titles, number of pages and date; material finishing schedules; Drawings, giving drawing number, title, date, revision date or mark; addenda, giving title, number, date; time schedule)*

ARTICLE A-4 CONTRACT PRICE

4.1 The *Contract Price*, which excludes *Value Added Taxes*, is:

/100 dollars \$

4.2 *Value Added Taxes* (of _____ %) payable by the *Owner* to the *Contractor* are:

/100 dollars \$

4.3 Total amount payable by the *Owner* to the *Contractor* for the *Work* is:

/100 dollars \$

4.4 These amounts shall be subject to adjustments as provided in the *Contract Documents*.

4.5 All amounts are in Canadian funds.

ARTICLE A-5 PAYMENT

5.1 Subject to the provisions of the *Contract Documents* and *Payment Legislation*, and in accordance with legislation and statutory regulations respecting holdback percentages, the *Owner* shall:

- .1 make progress payments to the *Contractor* on account of the *Contract Price* when due in the amount certified by the *Consultant* unless otherwise prescribed by *Payment Legislation* together with such *Value Added Taxes* as may be applicable to such payments,
- .2 upon *Substantial Performance of the Work*, pay to the *Contractor* the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment, and
- .3 upon the issuance of the final certificate for payment, pay to the *Contractor* the unpaid balance of the *Contract Price* when due together with such *Value Added Taxes* as may be applicable to such payment.

5.2 Interest

- .1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by adjudication, arbitration or court, interest at the following rates on such unpaid amounts shall also become due and payable until payment:
 - (1) 2% per annum above the prime rate for the first 60 days.
 - (2) 4% per annum above the prime rate after the first 60 days.
 Such interest shall be compounded on a monthly basis. The prime rate shall be the rate of interest quoted by *(Insert name of chartered lending institution whose prime rate is to be used)*

for prime business loans as it may change from time to time.

- .2 Interest shall apply at the rate and in the manner prescribed by paragraph 5.2.1 of this Article on the settlement amount of any claim in dispute that is resolved either pursuant to Part 8 of the General Conditions – DISPUTE RESOLUTION or otherwise, from the date the amount would have been due and payable under the *Contract*, had it not been in dispute, until the date it is paid.

ARTICLE A-6 RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

6.1 *Notices in Writing* will be addressed to the recipient at the address set out below.

6.2 The delivery of a *Notice in Writing* will be by hand, by courier, by prepaid first class mail, or by other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.

6.3 A *Notice in Writing* delivered by one party in accordance with this *Contract* will be deemed to have been received by the other party on the date of delivery if delivered by hand or courier, or if sent by mail it will be deemed to have been received five calendar days after the date on which it was mailed, provided that if either such day is not a *Working Day*, then the *Notice in Writing* will be deemed to have been received on the *Working Day* next following such day.

6.4 A *Notice in Writing* sent by any form of electronic communication will be deemed to have been received on the date of its transmission provided that if such day is not a *Working Day* or if it is received after the end of normal business hours on the date of its transmission at the place of receipt, then it will be deemed to have been received at the opening of business at the place of receipt on the first *Working Day* next following the transmission thereof.

6.5 An address for a party may be changed by *Notice in Writing* to the other party setting out the new address in accordance with this Article.

Owner

*name of Owner**

address

email address

Contractor

*name of Contractor**

address

email address

Consultant

*name of Consultant**

address

email address

** If it is intended that a specific individual must receive the notice, that individual's name shall be indicated.*

ARTICLE A-7 LANGUAGE OF THE CONTRACT

- 7.1 When the *Contract Documents* are prepared in both the English and French languages, it is agreed that in the event of any apparent discrepancy between the English and French versions, the English / French # language shall prevail.
Complete this statement by striking out inapplicable term.
- 7.2 This Agreement is drawn in English at the request of the parties hereto. La présente convention est rédigée en anglais à la demande des parties.

ARTICLE A-8 SUCCESSION

- 8.1 The *Contract* shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors, and assigns.

In witness whereof the parties hereto have executed this Agreement by the hands of their duly authorized representatives.

SIGNED AND DELIVERED
in the presence of:

WITNESS

OWNER

name of Owner

signature

signature

name of person signing

name and title of person signing

WITNESS

CONTRACTOR

name of Contractor

signature

signature

name of person signing

name and title of person signing

- N.B. Where legal jurisdiction, local practice or Owner or Contractor requirement calls for:*
- (a) proof of authority to execute this document, attach such proof of authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign the Agreement for and on behalf of the corporation or partnership; or*
 - (b) the affixing of a corporate seal, this Agreement should be properly sealed.*

DEFINITIONS

The following Definitions shall apply to all *Contract Documents*.

Change Directive

A *Change Directive* is a written instruction prepared by the *Consultant* and signed by the *Owner* directing the *Contractor* to proceed with a change in the *Work* within the general scope of the *Contract Documents* prior to the *Owner* and the *Contractor* agreeing upon adjustments in the *Contract Price* and the *Contract Time*.

Change Order

A *Change Order* is a written amendment to the *Contract* prepared by the *Consultant* and signed by the *Owner* and the *Contractor* stating their agreement upon:

- a change in the *Work*;
- the method of adjustment or the amount of the adjustment in the *Contract Price*, if any; and
- the extent of the adjustment in the *Contract Time*, if any.

Construction Equipment

Construction Equipment means all machinery and equipment, either operated or not operated, that is required for preparing, fabricating, conveying, erecting, or otherwise performing the *Work* but is not incorporated into the *Work*.

Consultant

The *Consultant* is the person or entity engaged by the *Owner* and identified as such in the Agreement. The *Consultant* is the Architect, the Engineer or entity licensed to practise in the province or territory of the *Place of the Work*.

Contract

The *Contract* is the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the *Contract Documents* and represents the entire agreement between the parties.

Contract Documents

The *Contract Documents* consist of those documents listed in Article A-3 of the Agreement – CONTRACT DOCUMENTS and amendments agreed upon between the parties.

Contract Price

The *Contract Price* is the amount stipulated in Article A-4 of the Agreement – CONTRACT PRICE.

Contract Time

The *Contract Time* is the time from commencement of the *Work* to the date of *Ready-for-Takeover* as stipulated in paragraph 1.3 of Article A-1 of the Agreement – THE WORK.

Contractor

The *Contractor* is the person or entity identified as such in the Agreement.

Drawings

The *Drawings* are the graphic and pictorial portions of the *Contract Documents*, wherever located and whenever issued, showing the design, location and dimensions of the *Work*, generally including plans, elevations, sections, details, and diagrams.

Notice in Writing

A *Notice in Writing*, where identified in the *Contract Documents*, is a written communication between the parties or between them and the *Consultant* that is transmitted in accordance with the provisions of Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

Owner

The *Owner* is the person or entity identified as such in the Agreement.

Other Contractor

Other Contractor means a contractor, other than the *Contractor* or a *Subcontractor*, engaged by the *Owner* for the *Project*.

Payment Legislation

Payment Legislation means such legislation in effect at the *Place of the Work* which governs payment under construction contracts.

Place of the Work

The *Place of the Work* is the designated site or location of the *Work* identified in the *Contract Documents*.

Product

Product or Products means material, machinery, equipment, and fixtures forming part of the *Work*, but does not include *Construction Equipment*.

Project

The *Project* means the total construction contemplated of which the *Work* may be the whole or a part.

Ready-for-Takeover

Ready-for-Takeover shall have been attained when the conditions set out in paragraph 12.1.1 of GC 12.1 – READY-FOR-TAKEOVER have been met, as verified by the *Consultant* pursuant to paragraph 12.1.4.2 of GC 12.1 – READY-FOR-TAKEOVER.

Shop Drawings

Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, *Product* data, and other data which the *Contractor* provides to illustrate details of portions of the *Work*.

Specifications

The *Specifications* are that portion of the *Contract Documents*, wherever located and whenever issued, consisting of the written requirements and standards for *Products*, systems, workmanship, quality, and the services necessary for the performance of the *Work*.

Subcontractor

A *Subcontractor* is a person or entity having a direct contract with the *Contractor* to perform a part or parts of the *Work* at the *Place of the Work*.

Substantial Performance of the Work

Substantial Performance of the Work is as defined in the lien legislation applicable to the *Place of the Work*.

Supplemental Instruction

A *Supplemental Instruction* is an instruction, not involving adjustment in the *Contract Price* or *Contract Time*, in the form of *Specifications*, *Drawings*, schedules, samples, models, or written instructions, consistent with the intent of the *Contract Documents*. It is to be issued by the *Consultant* to supplement the *Contract Documents* as required for the performance of the *Work*.

Supplier

A *Supplier* is a person or entity having a direct contract with the *Contractor* to supply *Products*.

Temporary Work

Temporary Work means temporary supports, structures, facilities, services, and other temporary items, excluding *Construction Equipment*, required for the execution of the *Work* but not incorporated into the *Work*.

Value Added Taxes

Value Added Taxes means such sum as shall be levied upon the *Contract Price* by the Federal or any Provincial or Territorial Government and is computed as a percentage of the *Contract Price* and includes the Goods and Services Tax, the Quebec Sales Tax, the Harmonized Sales Tax, and any similar tax, the collection and payment of which have been imposed on the *Contractor* by tax legislation.

Work

The *Work* means the total construction and related services required by the *Contract Documents*.

Working Day

Working Day means a day other than a Saturday, Sunday, statutory holiday, or statutory vacation day that is observed by the construction industry in the area of the *Place of the Work*.

GENERAL CONDITIONS

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

- 1.1.1 The intent of the *Contract Documents* is to include the labour, *Products* and services necessary for the performance of the *Work* by the *Contractor* in accordance with these documents. It is not intended, however, that the *Contractor* shall supply products or perform work not consistent with, not covered by, or not properly inferable from the *Contract Documents*.
- 1.1.2 The *Contract Documents* are complementary, and what is required by one shall be as binding as if required by all. Performance by the *Contractor* shall be required only to the extent consistent with the *Contract Documents*.
- 1.1.3 The *Contractor* shall review the *Contract Documents* for the purpose of facilitating co-ordination and execution of the *Work* by the *Contractor*.
- 1.1.4 The *Contractor* is not responsible for errors, omissions or inconsistencies in the *Contract Documents*. If there are perceived errors, omissions or inconsistencies discovered by or made known to the *Contractor*, the *Contractor* shall promptly report to the *Consultant* and shall not proceed with the work affected until the *Contractor* has received corrected or additional information from the *Consultant*.
- 1.1.5 If there is a conflict within the *Contract Documents*:
- .1 the order of priority of documents, from highest to lowest, shall be
 - the Agreement between *Owner* and *Contractor*,
 - the Definitions,
 - Supplementary Conditions,
 - the General Conditions,
 - Division 01 of the *Specifications*,
 - technical *Specifications*,
 - material and finishing schedules,
 - the *Drawings*.
 - .2 *Drawings* of larger scale shall govern over those of smaller scale of the same date.
 - .3 dimensions shown on *Drawings* shall govern over dimensions scaled from *Drawings*.
 - .4 amended or later dated documents shall govern over earlier documents of the same type.
 - .5 noted materials and annotations shall govern over graphic indications.
- 1.1.6 Nothing contained in the *Contract Documents* shall create any contractual relationship between:
- .1 the *Owner* and a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.
 - .2 the *Consultant* and the *Contractor*, a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.
- 1.1.7 Words and abbreviations which have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.
- 1.1.8 References in the *Contract Documents* to the singular shall be considered to include the plural as the context requires.
- 1.1.9 Neither the organization of the *Specifications* nor the arrangement of *Drawings* shall control the *Contractor* in dividing the work among *Subcontractors* and *Suppliers*.
- 1.1.10 *Specifications*, *Drawings*, models, and copies thereof furnished by the *Consultant* are and shall remain the *Consultant's* property, with the exception of the signed *Contract* sets, which shall belong to each party to the *Contract*. All *Specifications*, *Drawings* and models furnished by the *Consultant* are to be used only with respect to the *Work* and are not to be used on other work. These *Specifications*, *Drawings* and models are not to be copied or altered in any manner without the written authorization of the *Consultant*.
- 1.1.11 Physical models furnished by the *Contractor* at the *Owner's* expense are the property of the *Owner*.

GC 1.2 LAW OF THE CONTRACT

- 1.2.1 The law of the *Place of the Work* shall govern the interpretation of the *Contract*.

GC 1.3 RIGHTS AND REMEDIES

- 1.3.1 Except as expressly provided in the *Contract Documents*, the duties and obligations imposed by the *Contract Documents* and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights, and remedies otherwise imposed or available by law.

- 1.3.2 No action or failure to act by the *Owner*, the *Consultant* or the *Contractor* shall constitute a waiver of any right or duty afforded any of them under the *Contract*, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

GC 1.4 ASSIGNMENT

- 1.4.1 Neither party to the *Contract* shall assign the *Contract* or a portion thereof without the written consent of the other, which consent shall not be unreasonably withheld.

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.1 AUTHORITY OF THE CONSULTANT

- 2.1.1 The *Consultant* will have authority to act on behalf of the *Owner* only to the extent provided in the *Contract Documents*, unless otherwise modified by written agreement as provided in paragraph 2.1.2.
- 2.1.2 The duties, responsibilities and limitations of authority of the *Consultant* as set forth in the *Contract Documents* shall be modified or extended only with the written consent of the *Owner*, the *Consultant* and the *Contractor*.

GC 2.2 ROLE OF THE CONSULTANT

- 2.2.1 The *Consultant* will provide administration of the *Contract* as described in the *Contract Documents*.
- 2.2.2 The *Consultant* will visit the *Place of the Work* at intervals appropriate to the progress of construction to become familiar with the progress and quality of the work and to determine if the *Work* is proceeding in general conformity with the *Contract Documents*.
- 2.2.3 If the *Owner* and the *Consultant* agree, the *Consultant* will provide at the *Place of the Work*, one or more project representatives to assist in carrying out the *Consultant's* responsibilities. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in writing to the *Contractor*.
- 2.2.4 Based on the *Consultant's* observations and evaluation of the *Contractor's* applications for payment, the *Consultant* will determine the amounts owing to the *Contractor* under the *Contract* and will issue certificates for payment as provided in Article A-5 of the Agreement – PAYMENT, GC 5.3 – PAYMENT and GC 5.5 – FINAL PAYMENT.
- 2.2.5 The *Consultant* will not be responsible for and will not have control, charge or supervision of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs required in connection with the *Work* in accordance with the applicable construction safety legislation, other regulations or general construction practice. The *Consultant* will not be responsible for the *Contractor's* failure to perform the *Work* in accordance with the *Contract Documents*.
- 2.2.6 Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, the *Consultant* will be, in the first instance, the interpreter of the requirements of the *Contract Documents*.
- 2.2.7 Matters in question relating to the performance of the *Work* or the interpretation of the *Contract Documents* shall be initially referred in writing to the *Consultant* by the party raising the question for interpretations and findings and copied to the other party.
- 2.2.8 Interpretations and findings of the *Consultant* shall be consistent with the intent of the *Contract Documents*. In making such interpretations and findings the *Consultant* will not show partiality to either the *Owner* or the *Contractor*.
- 2.2.9 The *Consultant's* interpretations and findings will be given in writing to the parties within a reasonable time.
- 2.2.10 With respect to claims for a change in *Contract Price*, the *Consultant* will make findings as set out in GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.
- 2.2.11 The *Consultant* will have authority to reject work which in the *Consultant's* opinion does not conform to the requirements of the *Contract Documents*. Whenever the *Consultant* considers it necessary or advisable, the *Consultant* will have authority to require inspection or testing of work, whether or not such work is fabricated, installed or completed. However, neither the authority of the *Consultant* to act nor any decision either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the *Consultant* to the *Contractor*, *Subcontractors*, *Suppliers*, or their agents, employees, or other persons performing any of the *Work*.
- 2.2.12 During the progress of the *Work* the *Consultant* will furnish *Supplemental Instructions* to the *Contractor* with reasonable promptness or in accordance with a schedule for such instructions agreed to by the *Consultant* and the *Contractor*.
- 2.2.13 The *Consultant* will review and take appropriate action upon *Shop Drawings*, samples and other submittals by the *Contractor*, in accordance with the *Contract Documents*.

- 2.2.14 The *Consultant* will prepare *Change Orders* and *Change Directives* as provided in GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 2.2.15 The *Consultant* will conduct reviews of the *Work* to determine the date of *Substantial Performance of the Work* and verify that *Ready-for-Takeover* has been attained.
- 2.2.16 All certificates issued by the *Consultant* will be to the best of the *Consultant's* knowledge, information and belief. By issuing any certificate, the *Consultant* does not guarantee the *Work* is correct or complete.
- 2.2.17 The *Consultant* will receive and review written warranties and related documents required by the *Contract* and provided by the *Contractor* and will forward such warranties and documents to the *Owner* for the *Owner's* acceptance.
- 2.2.18 If the *Consultant's* engagement is terminated, the *Owner* shall immediately engage a *Consultant* against whom the *Contractor* makes no reasonable objection and whose duties and responsibilities under the *Contract Documents* will be that of the former *Consultant*.

GC 2.3 REVIEW AND INSPECTION OF THE WORK

- 2.3.1 The *Owner* and the *Consultant* shall have access to the *Work* at all times. The *Contractor* shall provide sufficient, safe and proper facilities at all times for the review of the *Work* by the *Consultant* and the inspection of the *Work* by authorized agencies. If parts of the *Work* are in preparation at locations other than the *Place of the Work*, the *Owner* and the *Consultant* shall be given access to such work whenever it is in progress.
- 2.3.2 If work is designated for tests, inspections or approvals in the *Contract Documents*, by the *Consultant's* instructions, or by the laws or ordinances of the *Place of the Work*, the *Contractor* shall give the *Consultant* reasonable notification of when the work will be ready for review and inspection. The *Contractor* shall arrange for and shall give the *Consultant* reasonable notification of the date and time of inspections by other authorities.
- 2.3.3 The *Contractor* shall furnish promptly to the *Consultant* two copies of certificates and inspection reports relating to the *Work*.
- 2.3.4 If the *Contractor* covers, or permits to be covered, work that has been designated for special tests, inspections or approvals before such special tests, inspections or approvals are made, given or completed, the *Contractor* shall, if so directed, uncover such work, have the inspections or tests satisfactorily completed, and make good covering work at the *Contractor's* expense.
- 2.3.5 The *Consultant* may order any portion or portions of the *Work* to be examined to confirm that such work is in accordance with the requirements of the *Contract Documents*. If the work is not in accordance with the requirements of the *Contract Documents*, the *Contractor* shall correct the work and pay the cost of examination and correction. If the work is in accordance with the requirements of the *Contract Documents*, the *Owner* shall pay the cost of examination and restoration.
- 2.3.6 The *Contractor* shall pay the cost of making any test or inspection, including the cost of samples required for such test or inspection, if such test or inspection is designated in the *Contract Documents* to be performed by the *Contractor* or is required by the laws or ordinances applicable to the *Place of the Work*.
- 2.3.7 The *Contractor* shall pay the cost of samples required for any test or inspection to be performed by others if such test or inspection is designated in the *Contract Documents*.

GC 2.4 DEFECTIVE WORK

- 2.4.1 The *Contractor* shall promptly correct defective work that has been rejected by the *Consultant* as failing to conform to the *Contract Documents* whether or not the defective work was incorporated in the *Work* or the defect is the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the *Contractor*.
- 2.4.2 The *Contractor* shall make good promptly *Other Contractors' work* destroyed or damaged by such corrections at the *Contractor's* expense.
- 2.4.3 If in the opinion of the *Consultant* it is not expedient to correct defective work or work not performed as provided in the *Contract Documents*, the *Owner* may deduct from the amount otherwise due to the *Contractor* the difference in value between the work as performed and that called for by the *Contract Documents*. If the *Owner* and the *Contractor* do not agree on the difference in value, they shall refer the matter to the *Consultant* for a finding.

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

- 3.1.1 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*.

3.1.2 The *Contractor* shall be solely responsible for construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the *Work* under the *Contract*.

GC 3.2 CONSTRUCTION BY THE OWNER OR OTHER CONTRACTORS

3.2.1 The *Owner* reserves the right to award separate contracts in connection with other parts of the *Project* to *Other Contractors* and to perform work with own forces.

3.2.2 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner's* own forces, the *Owner* shall:

- .1 provide for the co-ordination of the activities and work of *Other Contractors* and the *Owner's* own forces with the *Work* of the *Contract*;
- .2 enter into separate contracts with *Other Contractors* under conditions of contract which are compatible with the conditions of the *Contract*;
- .3 ensure that insurance coverage is provided to the same requirements as are called for in GC 11.1 – INSURANCE and co-ordinate such insurance with the insurance coverage of the *Contractor* as it affects the *Work*; and
- .4 take all reasonable precautions to avoid labour disputes or other disputes on the *Project* arising from the work of *Other Contractors* or the *Owner's* own forces.

3.2.3 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner's* own forces, the *Contractor* shall:

- .1 afford the *Owner* and *Other Contractors* reasonable opportunity to store their products and execute their work;
- .2 co-ordinate and schedule the *Work* with the work of *Other Contractors* or the *Owner's* own forces that are identified in the *Contract Documents*;
- .3 participate with *Other Contractors* and the *Owner* in reviewing their construction schedules when directed to do so; and
- .4 report promptly to the *Consultant* in writing any apparent deficiencies in the work of *Other Contractors* or of the *Owner's* own forces, where such work affects the proper execution of any portion of the *Work*, prior to proceeding with that portion of the *Work*.

3.2.4 Where a change in the *Work* is required as a result of the co-ordination and integration of the work of *Other Contractors* or *Owner's* own forces with the *Work*, the changes shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

3.2.5 Disputes and other matters in question between the *Contractor* and *Other Contractors* shall be dealt with as provided in Part 8 of the General Conditions – DISPUTE RESOLUTION provided the *Other Contractors* have reciprocal obligations. The *Contractor* shall be deemed to have consented to arbitration of any dispute with any *Other Contractor* whose contract with the *Owner* contains a similar agreement to arbitrate. In the absence of *Other Contractors* having reciprocal obligations, disputes and other matters in question initiated by the *Contractor* against *Other Contractors* will be considered disputes and other matters in question between the *Contractor* and the *Owner*.

3.2.6 Should the *Owner*, the *Consultant*, *Other Contractors*, or anyone employed by them directly or indirectly be responsible for ill-timed work necessitating cutting or remedial work to be performed, the cost of such cutting or remedial work shall be valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

GC 3.3 TEMPORARY WORK

3.3.1 The *Contractor* shall have the sole responsibility for the design, erection, operation, maintenance, and removal of *Temporary Work* unless otherwise specified in the *Contract Documents*.

3.3.2 The *Contractor* shall engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform those functions referred to in paragraph 3.3.1 where required by law or by the *Contract Documents* and in all cases where such *Temporary Work* is of such a nature that professional engineering skill is required to produce safe and satisfactory results.

3.3.3 Notwithstanding the provisions of GC 3.1 – CONTROL OF THE WORK, paragraphs 3.3.1 and 3.3.2 or provisions to the contrary elsewhere in the *Contract Documents* where such *Contract Documents* include designs for *Temporary Work* or specify a method of construction in whole or in part, such designs or methods of construction shall be considered to be part of the design of the *Work* and the *Contractor* shall not be held responsible for that part of the design or the specified method of construction. The *Contractor* shall, however, be responsible for the execution of such design or specified method of construction in the same manner as for the execution of the *Work*.

GC 3.4 CONSTRUCTION SCHEDULE

3.4.1 The *Contractor* shall:

- .1 prepare and submit to the *Owner* and the *Consultant* prior to the first application for payment, a construction schedule that indicates the timing of the major activities of the *Work* and provides sufficient detail of the critical events and their inter-relationship to demonstrate the *Work* will be performed in conformity with the *Contract Time*;
- .2 monitor the progress of the *Work* relative to the construction schedule and update the schedule on a monthly basis or as stipulated by the *Contract Documents*; and
- .3 advise the *Consultant* of any revisions required to the schedule as the result of extensions of the *Contract Time* as provided in Part 6 of the General Conditions – CHANGES IN THE WORK.

GC 3.5 SUPERVISION

3.5.1 The *Contractor* shall provide all necessary supervision and appoint a competent representative who shall be in attendance at the *Place of the Work* while the *Work* is being performed. The appointed representative shall not be changed except for valid reason.

3.5.2 The appointed representative shall represent the *Contractor* at the *Place of the Work*. Information and instructions provided by the *Consultant* to the *Contractor*'s appointed representative shall be deemed to have been received by the *Contractor*, except with respect to Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

GC 3.6 SUBCONTRACTORS AND SUPPLIERS

3.6.1 The *Contractor* shall preserve and protect the rights of the parties under the *Contract* with respect to work to be performed under subcontract, and shall:

- .1 enter into contracts or written agreements with *Subcontractors* and *Suppliers* to require them to perform their work as provided in the *Contract Documents*;
- .2 incorporate the applicable terms and conditions of the *Contract Documents* into all contracts or written agreements with *Subcontractors* and *Suppliers*; and
- .3 be as fully responsible to the *Owner* for acts and omissions of *Subcontractors*, *Suppliers* and any persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the *Contractor*.

3.6.2 The *Contractor* shall indicate in writing, if requested by the *Owner*, those *Subcontractors* or *Suppliers* whose bids have been received by the *Contractor* which the *Contractor* would be prepared to accept for the performance of a portion of the *Work*. Should the *Owner* not object before signing the *Contract*, the *Contractor* shall employ those *Subcontractors* or *Suppliers* so identified by the *Contractor* in writing for the performance of that portion of the *Work* to which their bid applies.

3.6.3 The *Owner* may, for reasonable cause, at any time before the *Owner* has signed the *Contract*, object to the use of a proposed *Subcontractor* or *Supplier* and require the *Contractor* to employ one of the other subcontract bidders.

3.6.4 If the *Owner* requires the *Contractor* to change a proposed *Subcontractor* or *Supplier*, the *Contract Price* and *Contract Time* shall be adjusted by the difference occasioned by such required change.

3.6.5 The *Contractor* shall not be required to employ as a *Subcontractor* or *Supplier*, a person or firm to which the *Contractor* may reasonably object.

3.6.6 The *Owner*, through the *Consultant*, may provide to a *Subcontractor* or *Supplier* information as to the percentage of the *Subcontractor*'s or *Supplier*'s work which has been certified for payment.

GC 3.7 LABOUR AND PRODUCTS

3.7.1 The *Contractor* shall maintain good order and discipline among the *Contractor*'s employees engaged on the *Work* and employ only workers that are skilled in the tasks assigned.

3.7.2 The *Contractor* shall provide and pay for labour, *Products*, tools, *Construction Equipment*, water, heat, light, power, transportation, and other facilities and services necessary for the performance of the *Work* in accordance with the *Contract*.

3.7.3 Unless otherwise specified in the *Contract Documents*, *Products* provided shall be new. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*.

GC 3.8 SHOP DRAWINGS

3.8.1 The *Contractor* shall provide *Shop Drawings* as required in the *Contract Documents*.

3.8.2 The *Contractor* shall provide *Shop Drawings* to the *Consultant* to review in accordance with an agreed schedule, or in the absence of an agreed schedule, in orderly sequence and sufficiently in advance so as to cause no delay in the *Work* or in the work of *Other Contractors* or the *Owner*'s own forces.

- 3.8.3 The *Contractor* shall review all *Shop Drawings* before providing them to the *Consultant*. The *Contractor* represents by this review that:
- .1 the *Contractor* has determined and verified all applicable field measurements, field construction conditions, *Product* requirements, catalogue numbers and similar data, or will do so, and
 - .2 the *Contractor* has checked and co-ordinated each *Shop Drawing* with the requirements of the *Work* and of the *Contract Documents*.
- 3.8.4 The *Consultant's* review is for conformity to the design concept and for general arrangement only.
- 3.8.5 At the time of providing *Shop Drawings*, the *Contractor* shall expressly advise the *Consultant* in writing of any deviations in a *Shop Drawing* from the requirements of the *Contract Documents*. The *Consultant* shall indicate the acceptance or rejection of such deviation expressly in writing.
- 3.8.6 The *Consultant's* review shall not relieve the *Contractor* of responsibility for errors or omissions in the *Shop Drawings* or for meeting all requirements of the *Contract Documents*.
- 3.8.7 The *Consultant* will review and return *Shop Drawings* in accordance with the schedule agreed upon, or, in the absence of such schedule, with reasonable promptness so as to cause no delay in the performance of the *Work*.

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCES

- 4.1.1 The *Contract Price* includes the cash allowances, if any, stated in the *Contract Documents*. The scope of the *Work* or costs included in such cash allowances shall be as described in the *Contract Documents*.
- 4.1.2 The *Contract Price*, and not the cash allowances, includes the *Contractor's* overhead and profit in connection with such cash allowances.
- 4.1.3 Expenditures under cash allowances shall be authorized by the *Owner* through the *Consultant*.
- 4.1.4 Where the actual cost of the *Work* under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the *Consultant's* direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the *Contract Price* for overhead and profit. Only where the actual cost of the *Work* under all cash allowances exceeds the total amount of all cash allowances shall the *Contractor* be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the *Contract Documents*.
- 4.1.5 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the *Contract Price* by *Change Order* without any adjustment for the *Contractor's* overhead and profit on such amount.
- 4.1.6 The value of the *Work* performed under a cash allowance is eligible to be included in progress payments.
- 4.1.7 The *Contractor* and the *Consultant* shall jointly prepare a schedule that shows when the items called for under cash allowances must be ordered to avoid delaying the progress of the *Work*.

GC 4.2 CONTINGENCY ALLOWANCE

- 4.2.1 The *Contract Price* includes the contingency allowance, if any, stated in the *Contract Documents*.
- 4.2.2 The contingency allowance includes the *Contractor's* overhead and profit in connection with such contingency allowance.
- 4.2.3 Expenditures under the contingency allowance shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 4.2.4 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the expenditures authorized under paragraph 4.2.3 and the contingency allowance.

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

- 5.1.1 The *Owner* shall, at the request of the *Contractor*, before signing the *Contract*, and promptly from time to time thereafter, furnish to the *Contractor* reasonable evidence that financial arrangements have been made to fulfill the *Owner's* obligations under the *Contract*.
- 5.1.2 The *Owner* shall give the *Contractor Notice in Writing* of any material change in the *Owner's* financial arrangements to fulfill the *Owner's* obligations under the *Contract* during the performance of the *Contract*.

GC 5.2 APPLICATIONS FOR PAYMENT

- 5.2.1 Applications for payment on account as provided in Article A-5 of the Agreement – PAYMENT shall be submitted monthly to the *Owner* and the *Consultant* simultaneously as the *Work* progresses.
- 5.2.2 Applications for payment shall be dated the last day of each payment period, which is the last day of the month or an alternative day of the month agreed in writing by the parties.
- 5.2.3 The amount claimed shall be for the value, proportionate to the amount of the *Contract*, of *Work* performed and *Products* delivered to the *Place of the Work* as of the last day of the payment period.
- 5.2.4 The *Contractor* shall submit to the *Consultant*, at least 15 calendar days before the first application for payment, a schedule of values for the parts of the *Work*, aggregating the total amount of the *Contract Price*, so as to facilitate evaluation of applications for payment.
- 5.2.5 The schedule of values shall be made out in such form as specified in the *Contract* and supported by such evidence as the *Consultant* may reasonably require.
- 5.2.6 Applications for payment shall be based on the schedule of values accepted by the *Consultant* and shall comply with the provisions of *Payment Legislation*.
- 5.2.7 Each application for payment shall include evidence of compliance with workers' compensation legislation at the *Place of the Work* and after the first payment, a declaration by the *Contractor* as to the distribution made of the amounts previously received using document CCDC 9A 'Statutory Declaration'.
- 5.2.8 Applications for payment for *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall be supported by such evidence as the *Consultant* may reasonably require to establish the value and delivery of the *Products*.

GC 5.3 PAYMENT

- 5.3.1 After receipt by the *Consultant* and the *Owner* of an application for payment submitted by the *Contractor* in accordance with GC 5.2 – APPLICATIONS FOR PAYMENT:
 - .1 The *Consultant* will issue to the *Owner* and copy to the *Contractor*, no later than 10 calendar days after the receipt of the application for payment, a certificate for payment in the amount applied for, or in such other amount as the *Consultant* determines to be properly due. If the *Consultant* certifies a different amount, or rejects the application or part thereof, the *Owner* shall promptly issue a written notice to the *Contractor* giving reasons for the revision or rejection, such written notice to be in compliance with *Payment Legislation*.
 - .2 The *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement – PAYMENT on or before 28 calendar days after the receipt by the *Owner* and the *Consultant* of the application for payment, and in any event, in compliance with *Payment Legislation*.

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

- 5.4.1 The *Consultant* will review the *Work* to certify or verify the validity of the application for *Substantial Performance of the Work* and will promptly, and in any event, no later than 20 calendar days after receipt of the *Contractors* application:
 - .1 advise the *Contractor* in writing that the *Work* or the designated portion of the *Work* is not substantially performed and give reasons why, or
 - .2 state the date of *Substantial Performance of the Work* or a designated portion of the *Work* in a certificate and issue a copy of that certificate to each of the *Owner* and the *Contractor*.
- 5.4.2 Where the holdback amount required by the applicable lien legislation has not been placed in a separate lien holdback account, the *Owner* shall, no later than 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*, place the holdback amount in a bank account in the joint names of the *Owner* and the *Contractor*.
- 5.4.3 Subject to the requirements of any *Payment Legislation*, all holdback amount prescribed by the applicable lien legislation for the *Work* shall become due and payable to the *Contractor* no later than 10 *Working Days* following the expiration of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*.
- 5.4.4 The *Contractor* shall submit an application for payment of the lien holdback amount in accordance with GC 5.3 – PAYMENT.
- 5.4.5 Where legislation permits progressive release of the holdback for a portion of the *Work* and the *Consultant* has certified or verified that the part of the *Work* has been performed prior to *Substantial Performance of the Work*, the *Owner* hereby agrees to release, and shall release, such portion to the *Contractor* in accordance with such legislation.

5.4.6 Notwithstanding any progressive release of the holdback, the *Contractor* shall ensure that such parts of the *Work* are protected pending the issuance of a final certificate for payment and be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when the holdback was released.

GC 5.5 FINAL PAYMENT

5.5.1 When the *Contractor* considers that the *Work* is completed, the *Contractor* shall submit an application for final payment.

5.5.2 The *Consultant* will, no later than 10 calendar days after the receipt of an application from the *Contractor* for final payment, review the *Work* to verify the validity of the application and when the *Consultant* finds the *Contractor*'s application for final payment valid, the *Consultant* will promptly issue a final certificate for payment to the *Owner*, with a copy to the *Contractor*.

5.5.3 If the *Consultant* rejects the application or part thereof, the *Owner* will promptly issue a written notice to the *Contractor* giving reasons for the revision or rejection, such written notice to be in compliance with *Payment Legislation*.

5.5.4 Subject to the provision of paragraph 10.4.1 of GC 10.4 – WORKERS' COMPENSATION, and any legislation applicable to the *Place of the Work*, the *Owner* shall, no later than 5 calendar days after the issuance of a final certificate for payment, pay the *Contractor* as provided in Article A-5 of the Agreement – PAYMENT and in any event, in compliance with *Payment Legislation*.

GC 5.6 DEFERRED WORK

5.6.1 If because of climatic or other conditions reasonably beyond the control of the *Contractor*, or if the *Owner* and the *Contractor* agree that, there are items of work that must be deferred, payment in full for that portion of the *Work* which has been performed as certified by the *Consultant* shall not be withheld or delayed by the *Owner* on account thereof, but the *Owner* may withhold, until the remaining portion of the *Work* is finished, only such an amount that the *Consultant* determines is sufficient and reasonable to cover the cost of performing such deferred *Work*.

GC 5.7 NON-CONFORMING WORK

5.7.1 No payment by the *Owner* under the *Contract* nor partial or entire use or occupancy of the *Work* by the *Owner* shall constitute an acceptance of any portion of the *Work* or *Products* which are not in accordance with the requirements of the *Contract Documents*.

PART 6 CHANGES IN THE WORK

GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

6.1.1 The *Owner*, through the *Consultant*, without invalidating the *Contract*, may make:

- .1 changes in the *Work* consisting of additions, deletions or other revisions to the *Work* by *Change Order* or *Change Directive*, and
- .2 changes to the *Contract Time* for the *Work*, or any part thereof, by *Change Order*.

6.1.2 The *Contractor* shall not perform a change in the *Work* without a *Change Order* or a *Change Directive*.

GC 6.2 CHANGE ORDER

6.2.1 When a change in the *Work* is proposed or required, the *Consultant* will provide the *Contractor* with a written description of the proposed change in the *Work*. The *Contractor* shall promptly present to the *Consultant*, in a form that can be reasonably evaluated, a method of adjustment or an amount of adjustment for the *Contract Price*, if any, and the adjustment in the *Contract Time*, if any, for the proposed change in the *Work*.

6.2.2 When the *Owner* and the *Contractor* agree to the adjustments in the *Contract Price* and *Contract Time* or to the method to be used to determine the adjustments, such agreement shall be effective immediately and shall be recorded in a *Change Order*. The value of the work performed as the result of a *Change Order* shall be included in the applications for progress payment.

GC 6.3 CHANGE DIRECTIVE

6.3.1 If the *Owner* requires the *Contractor* to proceed with a change in the *Work* prior to the *Owner* and the *Contractor* agreeing upon the corresponding adjustment in *Contract Price* and *Contract Time*, the *Owner*, through the *Consultant*, shall issue a *Change Directive*.

6.3.2 A *Change Directive* shall only be used to direct a change in the *Work* which is within the general scope of the *Contract Documents*.

6.3.3 A *Change Directive* shall not be used to direct a change in the *Contract Time* only.

- 6.3.4 Upon receipt of a *Change Directive*, the *Contractor* shall proceed promptly with the change in the *Work*.
- 6.3.5 For the purpose of valuing *Change Directives*, changes in the *Work* that are not substitutions or otherwise related to each other shall not be grouped together in the same *Change Directive*.
- 6.3.6 The adjustment in the *Contract Price* for a change carried out by way of a *Change Directive* shall be determined on the basis of the cost of the *Contractor's* actual expenditures and savings attributable to the *Change Directive*, valued in accordance with paragraph 6.3.7 and as follows:
- 1 If the change results in a net increase in the *Contractor's* cost, the *Contract Price* shall be increased by the amount of the net increase in the *Contractor's* cost, plus the *Contractor's* percentage fee on such net increase.
 - 2 If the change results in a net decrease in the *Contractor's* cost, the *Contract Price* shall be decreased by the amount of the net decrease in the *Contractor's* cost, without adjustment for the *Contractor's* percentage fee.
 - 3 The *Contractor's* fee shall be as specified in the *Contract Documents* or as otherwise agreed by the parties.
- 6.3.7 The cost of performing the work attributable to the *Change Directive* shall be limited to the actual cost of the following in as much as it contributes directly to the implementation of the *Change Directive*:

Labour

- 1 rates that are listed in the schedule or as agreed by the *Owner* and the *Contractor* including wages, benefits, compensation, contributions, assessments, or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan for:
 - (1) trade labour in the direct employ of the *Contractor*;
 - (2) the *Contractor's* personnel when stationed at the field office;
 - (3) the *Contractor's* personnel engaged at shops or on the road, in expediting the production or transportation of materials or equipment; and
 - (4) the *Contractor's* office personnel engaged in a technical capacity, or other personnel identified in Article A-3 of the Agreement – CONTRACT DOCUMENTS for the time spent in the performance of the *Work*;

Products, Construction Equipment and Temporary Work

- 2 cost of all *Products* including cost of transportation thereof;
- 3 in the absence of agreed rates, cost less salvage value of *Construction Equipment*, *Temporary Work* and tools, exclusive of hand tools under \$1,000 owned by the *Contractor*;
- 4 rental cost of *Construction Equipment*, *Temporary Work* and tools, exclusive of hand tools under \$1,000;
- 5 cost of all equipment and services required for the *Contractor's* field office;

Subcontract

- 6 subcontract amounts of Subcontractor with pricing mechanism approved by the *Owner*;

Others

- 7 travel and subsistence expenses of the *Contractor's* personnel described in paragraph 6.3.7.1;
- 8 deposits lost provided that they are not caused by negligent acts or omissions of the *Contractor*;
- 9 cost of quality assurance such as independent inspection and testing services;
- 10 charges levied by authorities having jurisdiction at the *Place of the Work*;
- 11 royalties, patent license fees, and damages for infringement of patents and cost of defending suits therefor subject always to the *Contractor's* obligations to indemnify the *Owner* as provided in paragraph 10.3.1 of GC 10.3 – PATENT FEES;
- 12 premium for all contract securities and insurance for which the *Contractor* is required, by the *Contract Documents*, to provide, maintain and pay in relation to the performance of the *Work*;
- 13 losses and expenses sustained by the *Contractor* for matters which are the subject of insurance under the policies prescribed in GC 11.1 – INSURANCE when such losses and expenses are not recoverable because the amounts are in excess of collectible amounts or within the deductible amounts;
- 14 taxes and duties, other than *Value Added Taxes*, income, capital, or property taxes, relating to the *Work* for which the *Contractor* is liable;
- 15 charges for voice and data communications, courier services, expressage, transmittal and reproduction of documents, and petty cash items;
- 16 cost for removal and disposal of waste products and debris;
- 17 legal costs, incurred by the *Contractor*, in relation to the performance of the *Work* provided that they are not:
 - (1) relating to a dispute between the *Owner* and the *Contractor* unless such costs are part of a settlement or awarded by arbitration or court,
 - (2) the result of the negligent acts or omissions of the *Contractor*, or
 - (3) the result of a breach of this *Contract* by the *Contractor*;
- 18 cost of auditing when requested by the *Owner*; and
- 19 cost of *Project* specific information technology in accordance with the method determined by the parties.

- 6.3.8 Notwithstanding any other provisions contained in the General Conditions of the *Contract*, it is the intention of the parties that the cost of any item under any cost element referred to in paragraph 6.3.7 shall cover and include any and all costs or liabilities attributable to the *Change Directive* other than those which are the result of or occasioned by any failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor's* attention to the *Work*. Any cost due to failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor's* performance of the *Work* attributable to the *Change Directive* shall be borne by the *Contractor*.
- 6.3.9 The *Contractor* shall keep full and detailed accounts and records necessary for the documentation of the cost of performing the *Work* attributable to the *Change Directive* and shall provide the *Consultant* with copies thereof.
- 6.3.10 For the purpose of valuing *Change Directives*, the *Owner* shall be afforded reasonable access to all of the *Contractor's* pertinent documents related to the cost of performing the *Work* attributable to the *Change Directive*.
- 6.3.11 Pending determination of the final amount of a *Change Directive*, the undisputed value of the *Work* performed as the result of a *Change Directive* is eligible to be included in progress payments.
- 6.3.12 If the *Owner* and the *Contractor* do not agree on the proposed adjustment in the *Contract Time* attributable to the change in the *Work*, or the method of determining it, the adjustment shall be referred to the *Consultant* for a finding.
- 6.3.13 When the *Owner* and the *Contractor* reach agreement on the adjustment to the *Contract Price* and to the *Contract Time*, this agreement shall be recorded in a *Change Order*.

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

- 6.4.1 If the *Owner* or the *Contractor* discover conditions at the *Place of the Work* which are:
- .1 subsurface or otherwise concealed physical conditions which existed before the commencement of the *Work* and differ materially from those indicated in the *Contract Documents*; or
 - .2 physical conditions, other than conditions due to weather, that are of a nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the *Contract Documents*,
- then the observing party shall give *Notice in Writing* to the other party of such conditions before they are disturbed and in no event later than 5 *Working Days* after first observance of the conditions.
- 6.4.2 The *Consultant* will promptly investigate such conditions and make a finding. If the finding is that the conditions differ materially and this would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, the *Owner*, through the *Consultant*, shall issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.
- 6.4.3 If the *Consultant* finds that the conditions at the *Place of the Work* are not materially different or that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* will promptly inform the *Owner* and the *Contractor* in writing.
- 6.4.4 If such concealed or unknown conditions relate to toxic and hazardous substances and materials, artifacts and fossils, or mould, the parties will be governed by the provisions of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, GC 9.3 – ARTIFACTS AND FOSSILS and GC 9.5 – MOULD.

GC 6.5 DELAYS

- 6.5.1 If the *Contractor* is delayed in the performance of the *Work* by the *Owner*, the *Consultant*, or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the *Contract Documents*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.
- 6.5.2 If the *Contractor* is delayed in the performance of the *Work* by a stop work order issued by a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or any person employed or engaged by the *Contractor* directly or indirectly, resulting in the failure of the *Contractor* to attain *Ready-for-Takeover* by the date stipulated in Article A-1 of the Agreement – THE WORK, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.
- 6.5.3 If the *Contractor* is delayed in the performance of the *Work* by:
- .1 labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractors' association, of which the *Contractor* is a member or to which the *Contractor* is otherwise bound),
 - .2 fire, unusual delay by common carriers or unavoidable casualties,
 - .3 abnormally adverse weather conditions, or

- 4 any cause beyond the *Contractor's* control other than one resulting from a default or breach of *Contract* by the *Contractor*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the *Contractor* agrees to a shorter extension. The *Contractor* shall not be entitled to payment for costs incurred by such delays unless such delays result from actions by the *Owner*, the *Consultant* or anyone employed or engaged by them directly or indirectly.
- 6.5.4 No extension shall be made for delay unless *Notice in Writing* of the cause of delay is given to the *Consultant* not later than 10 *Working Days* after the commencement of the delay. In the case of a continuing cause of delay only one *Notice in Writing* shall be necessary.
- 6.5.5 If no schedule is made under paragraph 2.2.12 of GC 2.2 – ROLE OF THE CONSULTANT, then no request for extension shall be made because of failure of the *Consultant* to furnish instructions until 10 *Working Days* after demand for such instructions has been made.

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

- 6.6.1 If the *Contractor* intends to make a claim for an increase to the *Contract Price*, or if the *Owner* intends to make a claim against the *Contractor* for a credit to the *Contract Price*, the party that intends to make the claim shall give timely *Notice in Writing* of intent to claim to the other party and to the *Consultant*.
- 6.6.2 Upon commencement of the event or series of events giving rise to a claim, the party intending to make the claim shall:
- .1 take all reasonable measures to mitigate any loss or expense which may be incurred as a result of such event or series of events, and
 - .2 keep such records as may be necessary to support the claim.
- 6.6.3 The party making the claim shall submit within a reasonable time to the *Consultant* a detailed account of the amount claimed and the grounds upon which the claim is based and the *Consultant* will make a finding upon such claim.
- 6.6.4 Where the event or series of events giving rise to the claim has a continuing effect, the detailed account submitted under paragraph 6.6.3 shall be considered to be an interim account and the party making the claim shall, at such intervals as the *Consultant* may reasonably require, submit further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.
- 6.6.5 The *Consultant's* findings, with respect to a claim made by either party, will be given by *Notice in Writing* to both parties within 30 *Working Days* after receipt of the claim by the *Consultant*, or within such other time period as may be agreed by the parties.
- 6.6.6 If such finding is not acceptable to either party, the claim shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION.

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

- 7.1.1 If the *Contractor* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Contractor's* insolvency, or if a receiver is appointed because of the *Contractor's* insolvency, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, terminate the *Contractor's* right to continue with the *Work*, by giving the *Contractor* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.
- 7.1.2 If the *Contractor* neglects to perform the *Work* properly or otherwise fails to comply with the requirements of the *Contract* to a substantial degree and if the *Consultant* has given a written statement to the *Owner* and *Contractor* which provides the detail of such neglect to perform the *Work* properly or such failure to comply with the requirements of the *Contract* to a substantial degree, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, give the *Contractor Notice in Writing*, containing particulars of the default including references to applicable provisions of the *Contract*, that the *Contractor* is in default of the *Contractor's* contractual obligations and instruct the *Contractor* to correct the default in the 5 *Working Days* immediately following the receipt of such *Notice in Writing*.
- 7.1.3 If the default cannot be corrected in the 5 *Working Days* specified or in such other time period as may be subsequently agreed in writing by the parties, the *Contractor* shall be in compliance with the *Owner's* instructions if the *Contractor*:
- .1 commences the correction of the default within the specified time,
 - .2 provides the *Owner* with an acceptable schedule for such correction, and
 - .3 corrects the default in accordance with the *Contract* terms and with such schedule.

- 7.1.4 If the *Contractor* fails to correct the default in the time specified or in such other time period as may be subsequently agreed in writing by the parties, without prejudice to any other right or remedy the *Owner* may have, the *Owner* may by giving *Notice in Writing*:
- .1 correct such default and deduct the cost thereof from any payment then or thereafter due the *Contractor* for the *Work* provided the *Consultant* has certified such cost to the *Owner* and the *Contractor*, or
 - .2 terminate the *Contractor*'s right to continue with the *Work* in whole or in part or terminate the *Contract*.
- 7.1.5 If the *Owner* terminates the *Contractor*'s right to continue with the *Work* as provided in paragraphs 7.1.1 and 7.1.4, the *Owner* shall be entitled to:
- .1 take possession of the *Work* and *Products* at the *Place of the Work*; subject to the rights of third parties, utilize the *Construction Equipment* at the *Place of the Work*; finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense,
 - .2 withhold further payment to the *Contractor* until a final certificate for payment is issued,
 - .3 charge the *Contractor* the amount by which the full cost of finishing the *Work* as certified by the *Consultant*, including compensation to the *Consultant* for the *Consultant*'s additional services and a reasonable allowance as determined by the *Consultant* to cover the cost of corrections to work performed by the *Contractor* that may be required under GC 12.3 – WARRANTY, exceeds the unpaid balance of the *Contract Price*; however, if such cost of finishing the *Work* is less than the unpaid balance of the *Contract Price*, the *Owner* shall pay the *Contractor* the difference, and
 - .4 on expiry of the warranty period, charge the *Contractor* the amount by which the cost of corrections to the *Contractor*'s work under GC 12.3 – WARRANTY exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the *Contractor* the difference.
- 7.1.6 The *Contractor*'s obligation under the *Contract* as to quality, correction and warranty of the work performed by the *Contractor* up to the time of termination shall continue in force after such termination of the *Contract*.

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

- 7.2.1 If the *Owner* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Owner*'s insolvency, or if a receiver is appointed because of the *Owner*'s insolvency, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.
- 7.2.2 If the *Work* is suspended or otherwise delayed for a period of 20 *Working Days* or more under an order of a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or of anyone directly or indirectly employed or engaged by the *Contractor*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* *Notice in Writing* to that effect.
- 7.2.3 The *Contractor* may give *Notice in Writing* to the *Owner*, with a copy to the *Consultant*, that the *Owner* is in default of the *Owner*'s contractual obligations if:
- .1 the *Owner* fails to furnish, when so requested by the *Contractor*, reasonable evidence that financial arrangements have been made to fulfill the *Owner*'s obligations under the *Contract*,
 - .2 the *Consultant* fails to issue a certificate as provided in Part 5 of the General Conditions – PAYMENT,
 - .3 the *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by adjudication, arbitration or court, or
 - .4 the *Owner* fails to comply with the requirements of the *Contract* to a substantial degree and the *Consultant*, except for GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, gives a written statement to the *Owner* and the *Contractor* that provides detail of such failure to comply with the requirements of the *Contract* to a substantial degree.
- 7.2.4 The *Contractor*'s *Notice in Writing* to the *Owner* provided under paragraph 7.2.3 shall advise that if the default is not corrected within 5 *Working Days* following the receipt of the *Notice in Writing*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, suspend the *Work* or terminate the *Contract*.
- 7.2.5 If the *Contractor* terminates the *Contract* by giving a *Notice in Writing* to the *Owner* under the conditions set out above, the *Contractor* shall be entitled to be paid for all work performed including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the termination of the *Contract*.

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

- 8.1.1 Differences between the parties to the *Contract* as to the interpretation, application or administration of the *Contract* or any failure to agree where agreement between the parties is called for, herein collectively called disputes, which are not resolved

in the first instance by findings of the *Consultant* as provided in GC 2.2 – ROLE OF THE CONSULTANT, shall be settled in accordance with the requirements of Part 8 of the General Conditions – DISPUTE RESOLUTION.

- 8.1.2 If a dispute arises under the *Contract* in respect of a matter in which the *Consultant* has no authority under the *Contract* to make a finding, the procedures set out in paragraph 8.1.3 and paragraphs 8.3.3 to 8.3.8 of GC 8.3 – NEGOTIATION, MEDIATION AND ARBITRATION, and in GC 8.4 – RETENTION OF RIGHTS apply to that dispute with the necessary changes to detail as may be required.
- 8.1.3 If a dispute is not resolved promptly, the *Consultant* will give such instructions as in the *Consultant's* opinion are necessary for the proper performance of the *Work* and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim the party may have. If it is subsequently determined that such instructions were in error or at variance with the *Contract Documents*, the *Owner* shall pay the *Contractor* costs incurred by the *Contractor* in carrying out such instructions which the *Contractor* was required to do beyond what the *Contract Documents* correctly understood and interpreted would have required, including costs resulting from interruption of the *Work*.

GC 8.2 ADJUDICATION

- 8.2.1 Nothing in this *Contract* shall be deemed to affect the rights of the parties to resolve any dispute by adjudication as may be prescribed by applicable legislation.

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

- 8.3.1 In accordance with the rules for mediation as provided in CCDC 40 'Rules for Mediation and Arbitration of Construction Industry Disputes' in effect at the time of bid closing, the parties shall appoint a Project Mediator
- .1 within 20 *Working Days* after the *Contract* was awarded, or
 - .2 if the parties neglected to make an appointment within the 20 *Working Days*, within 10 *Working Days* after either party by *Notice in Writing* requests that the Project Mediator be appointed.
- 8.3.2 A party shall be conclusively deemed to have accepted a finding of the *Consultant* under GC 2.2 – ROLE OF THE CONSULTANT and to have expressly waived and released the other party from any claims in respect of the particular matter dealt with in that finding unless, within 15 *Working Days* after receipt of that finding, the party sends a *Notice in Writing* of dispute to the other party and to the *Consultant*, which contains the particulars of the matter in dispute and the relevant provisions of the *Contract Documents*. The responding party shall send a *Notice in Writing* of reply to the dispute within 10 *Working Days* after receipt of such *Notice in Writing* setting out particulars of this response and any relevant provisions of the *Contract Documents*.
- 8.3.3 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, frank, candid, and timely disclosure of relevant facts, information and documents to facilitate these negotiations.
- 8.3.4 After a period of 10 *Working Days* following receipt of a responding party's *Notice in Writing* of reply under paragraph 8.3.2, the parties shall request the Project Mediator to assist the parties to reach agreement on any unresolved dispute. The mediated negotiations shall be conducted in accordance with the rules for mediation as provided in CCDC 40 in effect at the time of bid closing.
- 8.3.5 If the dispute has not been resolved at the mediation or within such further period as is agreed by the parties, the Project Mediator will terminate the mediated negotiations by giving *Notice in Writing* to the *Owner*, the *Contractor* and the *Consultant*.
- 8.3.6 By giving a *Notice in Writing* to the other party and the *Consultant*, not later than 10 *Working Days* after the date of termination of the mediated negotiations under paragraph 8.3.5, either party may refer the dispute to be finally resolved by arbitration under the rules of arbitration as provided in CCDC 40 in effect at the time of bid closing. The arbitration shall be conducted in the jurisdiction of the *Place of the Work*.
- 8.3.7 On expiration of the 10 *Working Days*, the arbitration agreement under paragraph 8.3.6 is not binding on the parties and, if a *Notice in Writing* is not given under paragraph 8.3.6 within the required time, the parties may refer the unresolved dispute to the courts or to any other form of dispute resolution, including arbitration, which they have agreed to use.
- 8.3.8 If neither party, by *Notice in Writing*, given within 10 *Working Days* of the date of *Notice in Writing* requesting arbitration in paragraph 8.3.6, requires that a dispute be arbitrated immediately, all disputes referred to arbitration as provided in paragraph 8.3.6 shall be:
- .1 held in abeyance until:
 - (1) *Ready-for-Takeover*,
 - (2) the *Contract* has been terminated, or
 - (3) the *Contractor* has abandoned the *Work*,whichever is earlier; and

.2 consolidated into a single arbitration under the rules governing the arbitration under paragraph 8.3.6.

GC 8.4 RETENTION OF RIGHTS

- 8.4.1 It is agreed that no act by either party shall be construed as a renunciation or waiver of any rights or recourses, provided the party has given the *Notice in Writing* required under Part 8 of the General Conditions – DISPUTE RESOLUTION and has carried out the instructions as provided in paragraph 8.1.3 of GC 8.1 – AUTHORITY OF THE CONSULTANT.
- 8.4.2 Nothing in Part 8 of the General Conditions – DISPUTE RESOLUTION shall be construed in any way to limit a party from asserting any statutory right to a lien under applicable lien legislation of the jurisdiction of the *Place of the Work* and the assertion of such right by initiating judicial proceedings is not to be construed as a waiver of any right that party may have under paragraph 8.3.6 of GC 8.3 – NEGOTIATION, MEDIATION AND ARBITRATION to proceed by way of arbitration to adjudicate the merits of the claim upon which such a lien is based.

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

- 9.1.1 The *Contractor* shall protect the *Work*, the *Owner's* property and property adjacent to the *Place of the Work* from damage which may arise as the result of the *Contractor's* operations under the *Contract*, and shall be responsible for such damage, except damage which occurs as the result of:
- .1 errors or omissions in the *Contract Documents*; or
 - .2 acts or omissions by the *Owner*, the *Consultant*, *Other Contractors*, or their agents and employees.
- 9.1.2 Before commencing any work, the *Contractor* shall determine the location of all underground utilities and structures indicated in the *Contract Documents* or that are reasonably apparent in an inspection of the *Place of the Work*.
- 9.1.3 Should the *Contractor* in the performance of the *Contract* damage the *Work*, the *Owner's* property or property adjacent to the *Place of the Work*, the *Contractor* shall be responsible for making good such damage at the *Contractor's* expense.
- 9.1.4 Should damage occur to the *Work* or the *Owner's* property for which the *Contractor* is not responsible, as provided in paragraph 9.1.1, the *Contractor* shall make good such damage to the *Work* and, if the *Owner* so directs, to the *Owner's* property. The *Contract Price* and *Contract Time* shall be adjusted as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

- 9.2.1 For the purposes of applicable legislation related to toxic and hazardous substances, the *Owner* shall be deemed to have control and management of the *Place of the Work* with respect to existing conditions.
- 9.2.2 Prior to the *Contractor* commencing the *Work*, the *Owner* shall,
- .1 take all reasonable steps to determine whether any toxic or hazardous substances are present at the *Place of the Work*, and
 - .2 provide the *Consultant* and the *Contractor* with a written list of any such substances that are known to exist and their locations.
- 9.2.3 The *Owner* shall take all reasonable steps to ensure that no person's exposure to any toxic or hazardous substance exceeds the time weighted levels prescribed by applicable legislation at the *Place of the Work* and that no property is damaged or destroyed as a result of exposure to, or the presence of, toxic or hazardous substances which were at the *Place of the Work* prior to the *Contractor* commencing the *Work*.
- 9.2.4 Unless the *Contract* expressly provides otherwise, the *Owner* shall be responsible for taking all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to dispose of, store or otherwise render harmless any toxic or hazardous substance which was present at the *Place of the Work* prior to the *Contractor* commencing the *Work*.
- 9.2.5 If the *Contractor*
- .1 encounters toxic or hazardous substances at the *Place of the Work*, or
 - .2 has reasonable grounds to believe that toxic or hazardous substances are present at the *Place of the Work*, which were not brought to the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible and which were not disclosed by the *Owner* or which were disclosed but have not been dealt with as required under paragraph 9.2.4, the *Contractor* shall
 - .3 take all reasonable steps, including stopping the *Work*, to ensure that no person's exposure to any toxic or hazardous substance exceeds any applicable time weighted levels prescribed by applicable legislation at the *Place of the Work*, and
 - .4 immediately report the circumstances to the *Consultant* and the *Owner* in writing.

- 9.2.6 If the *Owner* and the *Contractor* do not agree on the existence, significance of, or whether the toxic or hazardous substances were brought onto the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Contractor*.
- 9.2.7 If the *Owner* and the *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were not brought onto the place of the *Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall promptly at the *Owner's* own expense:
- .1 take all steps as required under paragraph 9.2.4;
 - .2 reimburse the *Contractor* for the costs of all steps taken pursuant to paragraph 9.2.5;
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in 9.2.6 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay; and
 - .4 indemnify the *Contractor* as required by GC 13.1 – INDEMNIFICATION.
- 9.2.8 If the *Owner* and the *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were brought onto the place of the *Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Contractor* shall promptly at the *Contractor's* own expense:
- .1 take all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to safely remove and dispose the toxic or hazardous substances;
 - .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the place of the *Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.2.6; and
 - .4 indemnify the *Owner* as required by GC 13.1 – INDEMNIFICATION.
- 9.2.9 If either party does not accept the expert's findings under paragraph 9.2.6, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraph 9.2.7 or 9.2.8 it being understood that by so doing, neither party will jeopardize any claim that party may have to be reimbursed as provided by GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

GC 9.3 ARTIFACTS AND FOSSILS

- 9.3.1 Fossils, coins, articles of value or antiquity, structures and other remains or things of scientific or historic interest discovered at the *Place or Work* shall, as between the *Owner* and the *Contractor*, be deemed to be the absolute property of the *Owner*.
- 9.3.2 The *Contractor* shall take all reasonable precautions to prevent removal or damage to discoveries as identified in paragraph 9.3.1, and shall advise the *Consultant* upon discovery of such items.
- 9.3.3 The *Consultant* will investigate the impact on the *Work* of the discoveries identified in paragraph 9.3.1. If conditions are found that would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, the *Owner*, through the *Consultant*, shall issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.

GC 9.4 CONSTRUCTION SAFETY

- 9.4.1 The *Contractor* shall be responsible for establishing, initiating, maintaining, and supervising all health and safety precautions and programs in connection with the performance of the *Work* in accordance with the applicable health and safety legislation.
- 9.4.2 The *Owner* and the *Contractor* shall comply with all health and safety precautions and programs established at the *Place of the Work*.
- 9.4.3 The *Owner* and the *Contractor* shall comply with the rules, regulations and practices required by the applicable health and safety legislation.
- 9.4.4 The *Owner* shall cause the *Consultant*, *Other Contractors* and the *Owner's* own forces to comply with all health and safety precautions and programs established by the *Contractor* at the *Place of the Work*.
- 9.4.5 Nothing in this *Contract* shall affect the determination of liability under the applicable health and safety legislation.

GC 9.5 MOULD

- 9.5.1 If the *Contractor* or the *Owner* observes or reasonably suspects the presence of mould at the *Place of the Work*, the remediation of which is not expressly part of the *Work*,
- .1 the observing party shall promptly report the circumstances to the other party in writing,
 - .2 the *Contractor* shall promptly take all reasonable steps, including stopping the *Work* if necessary, to ensure that no person suffers injury, sickness or death and that no property is damaged as a result of exposure to or the presence of the mould, and

- .3 if the *Owner* and the *Contractor* do not agree on the existence, significance or cause of the mould or as to what steps need be taken to deal with it, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Contractor*.
- 9.5.2 If the *Owner* and the *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was caused by the *Contractor's* operations under the *Contract*, the *Contractor* shall promptly, at the *Contractor's* own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould,
 - .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY,
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.5.1.3, and
 - .4 indemnify the *Owner* as required by GC 13.1 – INDEMNIFICATION.
- 9.5.3 If the *Owner* and the *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was not caused by the *Contractor's* operations under the *Contract*, the *Owner* shall promptly, at the *Owner's* own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould,
 - .2 reimburse the *Contractor* for the cost of taking the steps under paragraph 9.5.1.2 and making good any damage to the *Work* as provided in paragraph 9.1.4 of GC 9.1 – PROTECTION OF WORK AND PROPERTY,
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in paragraph 9.5.1.3 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay, and
 - .4 indemnify the *Contractor* as required by GC 13.1 – INDEMNIFICATION.
- 9.5.4 If either party does not accept the expert's finding under paragraph 9.5.1.3, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraphs 9.5.2 or 9.5.3, it being understood that by so doing neither party will jeopardize any claim the party may have to be reimbursed as provided by GC 9.5 – MOULD.

PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

- 10.1.1 The *Contract Price* shall include all taxes and customs duties in effect at the time of the bid closing except for *Value Added Taxes* payable by the *Owner* to the *Contractor* as stipulated in Article A-4 of the Agreement – CONTRACT PRICE.
- 10.1.2 Any increase or decrease in costs to the *Contractor* due to changes in taxes and duties after the time of the bid closing shall increase or decrease the *Contract Price* accordingly.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

- 10.2.1 The laws of the *Place of the Work* shall govern the *Work*.
- 10.2.2 The *Owner* shall obtain and pay for development approvals, building permit, permanent easements, rights of servitude, and all other necessary approvals and permits, except for the permits and fees referred to in paragraph 10.2.3 or for which the *Contract Documents* specify as the responsibility of the *Contractor*.
- 10.2.3 The *Contractor* shall be responsible for the procurement of permits, licences, inspections, and certificates, which are necessary for the performance of the *Work* and customarily obtained by contractors in the jurisdiction of the *Place of the Work* after the issuance of the building permit. The *Contract Price* includes the cost of these permits, licences, inspections, and certificates, and their procurement.
- 10.2.4 The *Contractor* shall give the required notices and comply with the laws, ordinances, rules, regulations, or codes which are or become in force during the performance of the *Work* and which relate to the *Work*, to the preservation of the public health, and to construction safety.
- 10.2.5 The *Contractor* shall not be responsible for verifying that the *Contract Documents* are in compliance with the applicable laws, ordinances, rules, regulations, or codes relating to the *Work*. If the *Contract Documents* are at variance therewith, or if, subsequent to the time of bid closing, changes are made to the applicable laws, ordinances, rules, regulations, or codes which require modification to the *Contract Documents*, the *Contractor* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will issue the changes required to the *Contract Documents* as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

- 10.2.6 If the *Contractor* fails to advise the *Consultant* in writing; fails to obtain direction as required in paragraph 10.2.5; and performs work knowing it to be contrary to any laws, ordinances, rules, regulations, or codes; the *Contractor* shall be responsible for and shall correct the violations thereof; and shall bear the costs, expenses and damages attributable to the failure to comply with the provisions of such laws, ordinances, rules, regulations, or codes.
- 10.2.7 If, subsequent to the time of bid closing, changes are made to applicable laws, ordinances, rules, regulations, or codes of authorities having jurisdiction which affect the cost of the *Work*, either party may submit a claim in accordance with the requirements of GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.

GC 10.3 PATENT FEES

- 10.3.1 The *Contractor* shall pay the royalties and patent licence fees required for the performance of the *Contract*. The *Contractor* shall hold the *Owner* harmless from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor*'s performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention by the *Contractor* or anyone for whose acts the *Contractor* may be liable.
- 10.3.2 The *Owner* shall hold the *Contractor* harmless against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor*'s performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention in executing anything for the purpose of the *Contract*, the physical model, plan or design of which was supplied to the *Contractor* as part of the *Contract*.

GC 10.4 WORKERS' COMPENSATION

- 10.4.1 Prior to commencing the *Work*, and again with the *Contractor*'s applications for payment, the *Contractor* shall provide evidence of compliance with workers' compensation legislation at the *Place of the Work*.

PART 11 INSURANCE

GC 11.1 INSURANCE

- 11.1.1 Without restricting the generality of GC 13.1 – INDEMNIFICATION, the *Contractor* shall provide, maintain and pay for the following insurance coverages, the requirements of which are specified in CCDC 41 'CCDC Insurance Requirements' in effect at the time of bid closing except as hereinafter provided:
1. General liability insurance in the name of the *Contractor* and include, or in the case of a single, blanket policy, be endorsed to name, the *Owner* and the *Consultant* as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the *Contractor* with regard to the *Work*. General liability insurance shall be maintained from the date of commencement of the *Work* until one year from the date of *Ready-for-Takeover*. Liability coverage shall be provided for completed operations hazards from the date of *Ready-for-Takeover* on an ongoing basis for a period of 6 years following *Ready-for-Takeover*.
 2. Automobile Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
 3. Unmanned aerial vehicle aircraft, manned aircraft or watercraft Liability Insurance when owned or non-owned manned or unmanned aircraft or watercraft are used directly or indirectly in the performance of the *Work*.
 4. "Broad form" property insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The "Broad form" property insurance shall be provided from the date of commencement of the *Work* until the earliest of:
 - (1) 10 calendar days after the date of *Ready-for-Takeover*;
 - (2) on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the *Work*; and
 - (3) when left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.
 5. Boiler and machinery insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of *Ready-for-Takeover*.
 6. The "Broad form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. In the event of loss or damage:
 - (1) the *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or damage shall not affect the rights and obligations of either party under the *Contract* except

that the *Contractor* shall be entitled to such reasonable extension of *Contract Time* relative to the extent of the loss or damage as the *Consultant* may recommend in consultation with the *Contractor*;

- (2) the *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount which the *Owner's* interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds in accordance with the progress payment provisions. In addition the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor's* interest in the restoration of the *Work*; and
- (3) to the *Work* arising from the work of the *Owner*, the *Owner's* own forces or *Other Contractors*, the *Owner* shall, in accordance with the *Owner's* obligations under the provisions relating to construction by the *Owner* or *Other Contractors*, pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as in accordance with the progress payment provisions.

- .7 *Contractors' Equipment Insurance* from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
- .8 *Contractors' Pollution Liability Insurance* from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.

11.1.2 Prior to commencement of the *Work* and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the *Contractor* shall promptly provide the *Owner* with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements applicable to the *Work*.

11.1.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the *Contract*.

11.1.4 If the *Contractor* fails to provide or maintain insurance as required by the *Contract Documents*, then the *Owner* shall have the right to provide and maintain such insurance and give evidence to the *Contractor* and the *Consultant*. The *Contractor* shall pay the cost thereof to the *Owner* on demand or the *Owner* may deduct the cost from the amount which is due or may become due to the *Contractor*.

11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the *Place of the Work*.

11.1.6 If a revised version of CCDC 41 is published, which specifies reduced insurance requirements, the parties shall address such reduction, prior to the *Contractor's* insurance policy becoming due for renewal, and record any agreement in a *Change Order*.

11.1.7 If a revised version of CCDC 41 is published, which specifies increased insurance requirements, the *Owner* may request the increased coverage from the *Contractor* by way of a *Change Order*.

11.1.8 A *Change Directive* shall not be used to direct a change in the insurance requirements in response to the revision of CCDC 41.

PART 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

12.1.1 The prerequisites to attaining *Ready-for-Takeover* of the *Work* are limited to the following:

- .1 The *Consultant* has certified or verified the *Substantial Performance of the Work*.
- .2 Evidence of compliance with the requirements for occupancy or occupancy permit as prescribed by the authorities having jurisdiction.
- .3 Final cleaning and waste removal at the time of applying for *Ready-for-Takeover*, as required by the *Contract Documents*.
- .4 The delivery to the *Owner* of such operations and maintenance documents reasonably necessary for immediate operation and maintenance, as required by the *Contract Documents*.
- .5 Make available a copy of the as-built drawings completed to date on site.
- .6 Startup, testing required for immediate occupancy, as required by the *Contract Documents*.
- .7 Ability to secure access to the *Work* has been provided to the *Owner*, if required by the *Contract Documents*.
- .8 Demonstration and training, as required by the *Contract Documents*, is scheduled by the *Contractor* acting reasonably.

12.1.2 If any prerequisites set forth in paragraphs 12.1.1.3 to 12.1.1.6 must be deferred because of conditions reasonably beyond the control of the *Contractor*, or by agreement between the *Owner* and the *Contractor* to do so, *Ready-for-Takeover* shall not be delayed.

12.1.3 When the *Contractor* considers that the *Work* is *Ready-for-Takeover*, the *Contractor* shall deliver to the *Consultant* and to the *Owner* a comprehensive list of items to be completed or corrected, together with a written application for *Ready-for-Takeover* for review. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.

12.1.4 The *Consultant* will review the *Work* to verify the validity of the application and will promptly, and in any event, no later than 10 calendar days after receipt of the *Contractor's* list and application:

- .1 advise the *Contractor* in writing that the *Work* is not *Ready-for-Takeover* and give reasons why, or
- .2 confirm the date of *Ready-for-Takeover* in writing to each of the *Owner* and the *Contractor*.

12.1.5 Immediately following the confirmation of the date of *Ready-for-Takeover*, the *Contractor*, in consultation with the *Consultant*, shall establish a reasonable date for finishing the *Work*.

12.1.6 The provision of GC 12.1 – READY-FOR-TAKEOVER shall be subject to GC 12.2 – EARLY OCCUPANCY BY THE OWNER.

GC 12.2 EARLY OCCUPANCY BY THE OWNER

12.2.1 The *Owner* may take occupancy of a part or the entirety of the *Work* before *Ready-for-Takeover* has been attained only as agreed by the *Contractor* which agreement shall not be unreasonably withheld.

12.2.2 The *Owner* shall not occupy a part or the entirety of the *Work* without prior approval by authorities having jurisdiction.

12.2.3 If the *Owner* takes occupancy of a part of the *Work* before *Ready-for-Takeover* has been attained:

- .1 The part of the *Work* which is occupied shall be deemed to have been taken over by the *Owner* as from the date on which it is occupied.
- .2 The *Contractor* shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the *Owner*.
- .3 The warranty period specified in paragraph 12.3.1 of GC 12.3 – WARRANTY for that part of the *Work* shall start from the date on which it is occupied.

12.2.4 If the *Owner* takes occupancy of the entirety of the *Work* before all the prerequisites are met as described in paragraph 12.1.1 of GC 12.1 – READY-FOR-TAKEOVER, the *Work* shall, subject to the requirements of the applicable lien legislation, be deemed to achieve *Ready-for-Takeover*. This shall not relieve the *Contractor*'s responsibility to complete the *Work* in a timely manner.

GC 12.3 WARRANTY

12.3.1 Except for extended warranties as described in paragraph 12.3.6, the warranty period under the *Contract* is one year from the date when *Ready-for-Takeover* has been attained.

12.3.2 The *Contractor* shall be responsible for the proper performance of the *Work* to the extent that the design and *Contract Documents* permit such performance.

12.3.3 The *Owner*, through the *Consultant*, shall promptly give the *Contractor Notice in Writing* of observed defects and deficiencies which occur during the one year warranty period.

12.3.4 Subject to paragraph 12.3.2, the *Contractor* shall correct promptly, at the *Contractor*'s expense, defects or deficiencies in the *Work* which appear prior to and during the one year warranty period.

12.3.5 The *Contractor* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.4.

12.3.6 Any extended warranties required beyond the one year warranty period as described in paragraph 12.3.1, shall be as specified in the *Contract Documents*. Extended warranties shall be issued by the warrantor to the benefit of the *Owner*. The *Contractor*'s responsibility with respect to extended warranties shall be limited to obtaining any such extended warranties from the warrantor. The obligations under such extended warranties are solely the responsibilities of the warrantor.

PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

13.1.1 Without restricting the parties' obligation to indemnify respecting toxic and hazardous substances, patent fees and defect in title claims all as described in paragraphs 13.1.4 and 13.1.5, the *Owner* and the *Contractor* shall each indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by them or in respect to claims by third parties that arise out of, or are attributable in any respect to their involvement as parties to this *Contract*, provided such claims are:

- .1 caused by:
 - (1) the negligent acts or omissions of the party from whom indemnification is sought or anyone for whose negligent acts or omissions that party is liable, or
 - (2) a failure of the party to the *Contract* from whom indemnification is sought to fulfill its terms or conditions; and
- .2 made by *Notice in Writing* within a period of 6 years from the *Ready-for-Takeover* date or within such shorter period as may be prescribed by any limitation statute of the Province or Territory of the *Place of the Work*.

The parties expressly waive the right to indemnity for claims other than those provided for in this *Contract*.

- 13.1.2 The obligation of either party to indemnify as set forth in paragraph 13.1.1 shall be limited as follows:
- .1 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is to be provided by either party pursuant to GC 11.1 – INSURANCE, the minimum liability insurance limit for one occurrence, of the applicable insurance policy, as referred to in CCDC 41 in effect at the time of bid closing.
 - .2 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is not required to be provided by either party in accordance with GC 11.1 – INSURANCE, the greater of the *Contract Price* as recorded in Article A-4 – CONTRACT PRICE or \$2,000,000, but in no event shall the sum be greater than \$20,000,000.
 - .3 In respect to indemnification by a party against the other with respect to losses suffered by them, such obligation shall be restricted to direct loss and damage, and neither party shall have any liability to the other for indirect, consequential, punitive or exemplary damages.
 - .4 In respect to indemnification respecting claims by third parties, the obligation to indemnify is without limit.
- 13.1.3 The obligation of either party to indemnify the other as set forth in paragraphs 13.1.1 and 13.1.2 shall be inclusive of interest and all legal costs.
- 13.1.4 The *Owner* and the *Contractor* shall indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of their obligations described in GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.
- 13.1.5 The *Owner* shall indemnify and hold harmless the *Contractor* from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings:
- .1 as described in paragraph 10.3.2 of GC 10.3 – PATENT FEES, and
 - .2 arising out of the *Contractor*'s performance of the *Contract* which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*.
- 13.1.6 In respect to any claim for indemnity or to be held harmless by the *Owner* or the *Contractor*:
- .1 *Notice in Writing* of such claim shall be given within a reasonable time after the facts upon which such claim is based become known; and
 - .2 should any party be required as a result of its obligation to indemnify another to pay or satisfy a final order, judgment or award made against the party entitled by this contract to be indemnified, then the indemnifying party upon assuming all liability for any costs that might result shall have the right to appeal in the name of the party against whom such final order or judgment has been made until such rights of appeal have been exhausted.

GC 13.2 WAIVER OF CLAIMS

- 13.2.1 Subject to any lien legislation applicable to the *Place of the Work*, the *Contractor* waives and releases the *Owner* from all claims which the *Contractor* has or reasonably ought to have knowledge of that could be advanced by the *Contractor* against the *Owner* under the *Contract*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the *Ready-for-Takeover* date, except as follows:
- .1 claims arising prior to or on the *Ready-for-Takeover* date for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* no later than 5 calendar days before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work* or 20 calendar days following the *Ready-for-Takeover* date, whichever is later;
 - .2 indemnification for claims advanced against the *Contractor* by third parties for which a right of indemnification may be asserted by the *Contractor* against the *Owner* pursuant to the provisions of this *Contract*;
 - .3 claims respecting toxic and hazardous substances, patent fees and defect in title matters for which a right of indemnity could be asserted by the *Contractor* pursuant to the provisions of paragraphs 13.1.4 or 13.1.5 of GC 13.1 – INDEMNIFICATION; and
 - .4 claims resulting from acts or omissions which occur after the *Ready-for-Takeover* date.
- 13.2.2 The *Contractor* waives and releases the *Owner* from all claims resulting from acts or omissions which occurred after the *Ready-for-Takeover* date except for:
- .1 indemnification respecting third party claims, and claims respecting toxic and hazardous substances, patent fees and defect in title matters, all as referred in paragraphs 13.2.1.2 and 13.2.1.3; and
 - .2 claims for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* within 395 calendar days following the *Ready-for-Takeover* date.
- 13.2.3 Subject to any lien legislation applicable to the *Place of the Work*, the *Owner* waives and releases the *Contractor* from all claims which the *Owner* has or reasonably ought to have knowledge of that could be advanced by the *Owner* against the *Contractor* under the *Contract*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the *Ready-for-Takeover* date, except as follows:
- .1 claims arising prior to or on the *Ready-for-Takeover* date for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* no later than 20 calendar days following the *Ready-for-Takeover* date;

- .2 indemnification for claims advanced against the *Owner* by third parties for which a right of indemnification may be asserted by the *Owner* against the *Contractor* pursuant to the provisions of this *Contract*;
 - .3 claims respecting toxic and hazardous substances for which a right of indemnity could be asserted by the *Owner* against the *Contractor* pursuant to the provisions of paragraph 13.1.4 of GC 13.1 – INDEMNIFICATION;
 - .4 damages arising from the *Contractor*'s actions which result in substantial defects or deficiencies in the *Work*. “Substantial defects or deficiencies” mean those defects or deficiencies in the *Work* which affect the *Work* to such an extent or in such a manner that a significant part or the whole of the *Work* is unfit for the purpose intended by the *Contract Documents*;
 - .5 claims arising pursuant to GC 12.3 – WARRANTY; and
 - .6 claims arising from acts or omissions which occur after the *Ready-for-Takeover* date.
- 13.2.4 Respecting claims arising upon substantial defects and deficiencies in the *Work*, as referenced in paragraph 13.2.3.4, and notwithstanding paragraph 13.2.3.5, the *Owner* waives and releases the *Contractor* from all claims except claims for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* within a period of six years from the *Ready-for-Takeover* date, provided that any limitation statute of the Province or Territory of the *Place of the Work* permit such agreement. If the applicable limitation statute does not permit such agreement, the time within which any such claim may be brought shall be such shorter period as may be prescribed by any limitation statute of the Province or Territory of the *Place of the Work*.
- 13.2.5 The *Owner* waives and releases the *Contractor* from all claims arising from acts or omissions which occur after the *Ready-for-Takeover* date, except for:
- .1 indemnification for claims advanced against the *Owner* by third parties, as referenced in paragraph 13.2.3.2;
 - .2 claims respecting toxic and hazardous substances for which a right of indemnity could be asserted by the *Owner* against the *Contractor*, as referenced in paragraph 13.2.3.3;
 - .3 claims arising under GC 12.3 – WARRANTY; and
 - .4 claims for which *Notice in Writing* has been received by the *Contractor* from the *Owner* within 395 calendar days following the *Ready-for-Takeover* date.
- 13.2.6 “*Notice in Writing* of claim” as provided for in GC 13.2 – WAIVER OF CLAIMS to preserve a claim or right of action which would otherwise, by the provisions of GC 13.2 – WAIVER OF CLAIMS, be deemed to be waived, must include the following:
- .1 a clear and unequivocal statement of an intention to claim;
 - .2 a statement as to the nature of the claim and the grounds upon which the claim is based; and
 - .3 a statement of the estimated quantum of the claim.
- 13.2.7 A claim for lien asserted under the lien legislation prevailing at the *Place of the Work* shall qualify as notice of claim for the purposes of this *Contract*.
- 13.2.8 The party giving the *Notice in Writing* of claim as provided for in GC 13.2 – WAIVER OF CLAIMS shall submit within a reasonable time a detailed account of the amount claimed.
- 13.2.9 Where the event or series of events giving rise to a claim made under paragraphs 13.2.1 or 13.2.3 has a continuing effect, the detailed account submitted under paragraph 13.2.8 shall be considered to be an interim account and the party making the claim shall submit further interim accounts, at reasonable intervals, giving the accumulated amount of the claim and any further grounds upon which such claim is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.
- 13.2.10 Nothing in GC 13.2 – WAIVER OF CLAIMS shall be deemed to affect the rights of the parties under any lien legislation or limitations legislation prevailing at the *Place of the Work*.

SUPPLEMENTARY CONDITIONS
STANDARD CONSTRUCTION DOCUMENT – CCDC 2 – 2020

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APPENDIX 2 TO THE SUPPLEMENTARY CONDITIONS PROPER INVOICE
REQUIREMENTS

- Exhibit A To Appendix 2 To The Supplementary Conditions Proper Invoice Template
- Exhibit B To Appendix 2 To The Supplementary Conditions Form Of Final Waiver And Release

APPENDIX 3 TO THE SUPPLEMENTARY CONDITIONS INSURANCE

AGREEMENT BETWEEN OWNER AND CONTRACTOR

ARTICLE A-1 THE WORK

SC-1 Delete paragraph 1.3 of Article A-1 and replace it with the following:

“commence the *Work* by the date stipulated by the *Owner* in the *Notice of Award* and, subject to adjustment in *Contract Time* as provided for in the *Contract Documents*, attain *Ready-for-Takeover* and *Completion* in accordance with the *Agreement Term Sheet*.”

SC-2 Add the following new paragraphs 1.4 and 1.5 to Article A-1:

“1.4 The *Contractor* shall diligently perform and complete the *Work* in accordance with the *Standard of Care*, all *Applicable Laws* and all terms and conditions of the *Contract Documents*, including the *Construction Schedule*.

1.5 The *Contractor* represents that in entering into the *Contract* with the *Owner* for the performance of the *Work*, it has either in accordance with the *Standard of Care* inspected the *Place of the Work* and reviewed for itself all information provided by the *Owner*, the character of the *Work* to be done, and all local conditions, including the position of all registered easements, pole lines, conduits, watermains, sewers and other underground and overground utilities and structures, or that, not having so inspected and reviewed, the *Contractor* has assumed and does hereby assume all risk of conditions now existing or arising in the course of the *Work* that might or could make the *Work*, or any items thereof, more expensive in character, or more onerous to fulfil than was contemplated or known as of the *Effective Date*. For certainty, the *Contractor* shall not be liable for conditions which would not have been ascertainable by a diligent review of the *Place of the Work*, all information provided by the *Owner*, the character of the *Work* to be done, and all local conditions in accordance with the *Standard of Care* prior to the *Effective Date*.”

ARTICLE A-4 CONTRACT PRICE

SC-3 Add new paragraphs 4.6 and 4.7 to Article A-4 as follows:

“4.6 To secure performance of the *Contractor*’s warranty obligations the *Owner* shall retain from each *Proper Invoice* an amount equal to the percentage of the total amount claimed for payment in such *Proper Invoice* (exclusive of *Value Added Taxes*) as stipulated in the *Agreement Term Sheet* (the “**Warranty Security**”).

4.7 For the purposes of paragraph 6.5.7, if the *Contractor* fails to achieve *Ready-for-Takeover* by the *Ready-for-Takeover Date* then the *Contractor* shall be liable to the *Owner* for liquidated damages in the amount per day stipulated in the *Agreement Term Sheet* for each day or part day of delay until *Ready-for-Takeover* is achieved.”

ARTICLE A-5 PAYMENT

SC-4 Delete paragraphs 5.1 and 5.2 of Article A-5 in its entirety and replace it with the following:

“5.1 Subject to the provisions of the *Contract Documents* and *Payment Legislation*, including in accordance with statutory regulations respecting holdback percentages, the *Owner* shall:

- .1 make progress payments to the *Contractor* on account of the *Contract Price* (excluding the *Warranty Security*) when due together with such *Value Added Taxes* as may be applicable to such payments,
- .2 upon *Substantial Performance of the Work*, pay to the *Contractor* the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment,
- .3 upon *Completion*, pay to the *Contractor* the unpaid balance of the *Contract Price* (excluding the *Warranty Security* and any unauthorized cash allowances, contingencies and provisional items) when due together with such *Value Added Taxes* as may be applicable to such payment, and
- .4 upon the issuance of the *Proper Invoice* for payment of the *Warranty Security* (less any deductions to such security applied in accordance with this *Contract*) following satisfaction of all requirements set out in paragraph 12.3.8, pay the *Warranty Security* when due together with such *Value Added Taxes* as may be applicable to such payment.

For certainty, all payments made by the *Owner* pursuant to subparagraphs 5.1.1, 5.1.2 and 5.1.3 shall be exclusive of the *Warranty Security*, which amount shall be paid as a milestone payment in accordance with subparagraph 5.1.4.

5.2 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by adjudication, arbitration or court, interest shall also become due and payable at the rates stipulated in the *Payment Legislation*.”

ARTICLE A-6 RECEIPT AND ADDRESSES FOR NOTICES IN WRITING

SC-5 Delete paragraph 6.5 of Article A-6 in its entirety and replace it with the following:

“6.5 Contact information for a party may be changed by *Notice in Writing* to the other party setting out the new contact information in accordance with this Article A-6.”

ARTICLE A-9 RELATIONSHIP OF THE PARTIES

ARTICLE A-10 PANDEMIC

ARTICLE A-11 INTERPRETATION AND OTHER MATTERS

SC-6 Add new Articles A-9, A-10 and A-11 as follows:

“ARTICLE A-9 RELATIONSHIP OF THE PARTIES

- 9.1 The *Contractor* shall be an independent contractor in performing its obligations under the *Contract*. The *Contract* does not create any agency, partnership, joint venture, fiduciary or other relationship of the *Contractor* with the *Owner* other than the relationship of independent contractor.
- 9.2 No inspection, review, comment, approval, verification, confirmation, certification, acknowledgement or audit pursuant to the provisions of the *Contract* by any *Owner Personnel*, nor any failure of any of them to do so, shall relieve the *Contractor* from performing or fulfilling any of its obligations under the *Contract* or be construed as an acceptance of the *Work* or any part thereof.”

ARTICLE A-10 PANDEMIC

- 10.1 The parties acknowledge and agree that as of the *Effective Date*:
- .1 the *Pandemic* is on-going and, as a result, *Governmental Authorities*, including the Government of Canada, the Province of Ontario, The Regional Municipality of Halton and the *Municipality*, have implemented *Governmental Responses*; and
 - .2 it is uncertain how long the *Pandemic* and the related *Governmental Responses* will continue and whether there may be a resurgence of *COVID-19* resulting in a *Pandemic Change in Law*.
- 10.2 Except as expressly provided in this *Contract*, each party shall be solely responsible for costs and expenses incurred in performance of its obligations under the *Contract* related to or arising from the *Pandemic* and compliance with *Governmental Responses*, including in respect of the contraction by or infection of *Contractor Personnel* and *Owner Personnel*, as applicable, with *COVID-19* and neither party assumes responsibility whatsoever with respect to any such loss suffered by the other.
- 10.3 In addition to any *Governmental Responses*, the *Contractor* shall comply with any other *Pandemic*-related protocols and guidelines pertaining to the *Work* or *Place of the Work* that may be communicated to the *Contractor* by the *Owner* in writing.

- 10.4 Notwithstanding any other term of this Contract, the *Owner* and *Contractor* acknowledge and agree that under no circumstance shall any *Contractor Personnel* be obligated to provide or disclose the personal information of any *Contractor Personnel* to the *Owner* or any other third party.
- 10.5 The *Contractor* expressly acknowledges and agrees that the *Contract Price* and *Contract Time* account for and are inclusive of all costs and impacts to the *Work* resultant or arising from *COVID-19*, any *Governmental Response* and the *Pandemic* to the extent such costs and impacts were known as of the *Effective Date*. For certainty, the *Contractor* acknowledges and agrees that the following impacts of *COVID-19*, the *Pandemic* and *Governmental Responses* to performance of the *Work* were known as of the *Effective Date* and, accordingly, are fully accounted for in the *Contract Price* and *Contract Time*:
- .1 the best practices recommended by the Ontario Ministry of Labour for construction site health and safety during the *Pandemic* in effect at the date of the *Contract*;
 - .2 the need to implement physical distancing;
 - .3 the obligation to monitor workers, personnel and visitors to the *Place of the Work* for illness or *COVID-19* symptoms;
 - .4 the potential for loss of *Contractor Personnel* due to illness, *COVID-19* symptoms or exposure to Persons with same;
 - .5 the need to implement procedures for timely reporting (including to the *Owner*) of any illness or *COVID-19* symptoms experienced by workers, personnel or visitors to the *Place of the Work*;
 - .6 the provision of necessary tools, equipment or personal protective equipment to all persons at the *Place of the Work*, including all *Contractor Personnel* and authorized visitors to the *Place of the Work*;
 - .7 the need to install any temporary facilities or structures (such as wash stations); and
 - .8 the need to implement appropriate sanitation and cleaning at the *Place of the Work* and in performance of the *Work*.

- 10.6 The *Owner* reserves the right, in its sole discretion and by *Notice in Writing*, to delay commencement or suspend performance of the *Work*, as applicable, for such time as is reasonably necessary to mitigate or prevent risks to public health and safety resultant from *COVID-19* and the *Pandemic*. Performance of the *Work* by the *Contractor* shall be resumed upon the *Owner*'s provision of fifteen (15) days' written notice to the *Contractor*. The *Contract Time* shall be extended for such reasonable time as agreed by the *Owner* and *Contractor* and any reasonable costs related to the *Work* and directly incurred by the *Contractor* during any such period of delay shall be reimbursed by the *Owner*, except to the extent required or caused by the negligence or breach of this *Contract* by any *Contractor Personnel*. The extension of time shall not be less than the time lost as a result of such delay, unless the *Contractor* agrees to a shorter extension. The parties' agreement regarding such adjustment to the *Contract Time* and reimbursement of reasonable costs shall be set out in a *Change Order*. Otherwise, any dispute in this regard shall be resolved in accordance with PART 8 – DISPUTE RESOLUTION.
- 10.7 Notwithstanding any other provision in the *Contract*, if the *Contractor* is delayed in performing or unable to perform the *Work* as a result of a *Pandemic Change in Law*, then, except to the extent caused by the negligence or breach of this *Contract* by any *Contractor Personnel*, the *Contract Time* shall be extended for such reasonable time as agreed by the *Owner* and *Contractor*. The extension of time shall not be less than the time lost as a result of the *Pandemic Change in Law*, unless the *Contractor* agrees to a shorter extension. The *Contractor* shall not be entitled to payment for any costs incurred as a result of such delays, save and except as expressly provided for in paragraph 10.8 of this Article A-10.
- 10.8 The *Contractor* shall be entitled to payment for the following direct costs it reasonably incurs as a direct result of a *Pandemic Change in Law* provided that such costs have been approved in advance and in writing by the *Owner* and were not required or caused by the negligence or breach of this *Contract* by any *Contractor Personnel*:
- .1 the *Contractor* being required to purchase, use or provide additional safety-related supplies, including personal protective equipment, in connection with its performance of the *Work*;
 - .2 the *Contractor* being required to install additional temporary facilities or structures, including hand washing stations; and
 - .3 the costs incurred by the *Contractor* to reasonably mitigate the effect of any delay to performance of the *Work* resultant from a *Pandemic Change in Law*.
- 10.9 Notwithstanding any other term of this *Contract*:

- .1 the *Contractor* shall not be entitled to any extension of *Contract Time* or to any compensation in respect of any *Pandemic Change in Law* or delay referred to in this Article A-10 to the extent such delay or costs resulted from the *Contractor's* failure to take reasonable steps to mitigate the effect of the delay or *Pandemic Change in Law*, as applicable;
 - .2 in no event shall the *Owner* be liable for any costs or damages incurred by the *Contractor* as a result of any *Pandemic Change in Law* or delay referred to in this Article A-10 except as expressly stipulated in this *Contract*, including no liability for: (i) any costs associated with increased labour or material costs; (ii) any costs associated with supply chain impacts or delays; or (iii) any *Consequential Damages*;
 - .3 there will be no unjust enrichment from a *Pandemic Change in Law*.
- 10.10 In all cases where the *Contractor* considers itself entitled to an extension of the *Contract Time* or compensation as a result of *COVID-19*, the *Pandemic* or a *Pandemic Change in Law*, the *Contractor* shall provide the *Owner* with *Notice in Writing* within five (5) *Working Days* of the date on which the *Contractor* knew that it was so impacted. The *Contractor* shall keep detailed records of all resultant additional costs and schedule impacts and shall provide such records to the *Owner*, including with such *Notice in Writing* to the extent available at such time. Additionally, the *Contractor* shall seek the *Owner's* approval in writing in advance of taking any measures to mitigate the impact of *COVID-19*, the *Pandemic* or a *Pandemic Change in Law*.”

ARTICLE A-11 - INTERPRETATION AND OTHER MATTERS

- 11.1 In the *Contract Documents* the word “including” means “including without limitation”, and the word “includes” means “includes without limitation”.
- 11.2 If any provision of the *Contract* is determined to be invalid, illegal or unenforceable in whole or in part, such invalidity, illegality or unenforceability will only apply to such provision or part, as the case may be, and any other part and all other provisions of the *Contract* shall remain in full force and effect. Furthermore, the parties shall endeavour to agree on a provision which reflects insofar as reasonably possible the commercial intentions of the invalid, illegal or unenforceable provision or part.
- 11.3 Each party shall from time to time execute and deliver all such further documents and instruments and do all acts and things as the other party may reasonably require to effectively carry out, better evidence or perfect the full intent and meaning of the *Contract*.
- 11.4 The provisions of the *Contract* which by their nature are continuing shall survive termination of the *Contract*.”

DEFINITIONS

SC-7 Amend the definition of **Consultant** by adding the following to the end:

“Notwithstanding the foregoing, where the *Owner* has not engaged a person or entity to act as the “*Consultant*” such that no person or entity is so identified in the Agreement, the *Owner* shall be deemed to be the *Consultant* under the *Contract*.”

SC-8 Amend the definition of **Contract Price** by adding the following to the end:

“For certainty, the *Contract Price* is inclusive of the *Warranty Security*.”

SC-9 Delete the definition of **Contract Time** and replace it with the following:

Contract Time

The *Contract Time* is the time from commencement of the *Work* to the date of *Completion*, including the *Ready-for-Takeover Date* and *Completion Date*.”

SC-10 Amend the definition of **Other Contractor** by adding the following to the end after the word “*Project*”:

“or for other work at the *Place of the Work*”

SC-11 Amend the definition of **Payment Legislation** by adding the following to the end:

“For certainty, where the *Place of the Work* is in Ontario *Payment Legislation* means the *Construction Act*.”

SC-12 Add the following new definitions:

Abnormally Adverse Weather Condition

Abnormally Adverse Weather Condition means an extreme and unusual climatic condition characterized by wind speed, air temperature, precipitation, or snow fall that is less than or greater than (as applicable) one and a half (1.5) standard deviations from the mean condition determined from the official weather records of Environment and Climate Change Canada (or its successor) for the 10-year period immediately preceding the date of the abnormally adverse weather event.

Addenda

Addenda means any additions or changes to the tender documents issued by the Owner for the *Work* prior to the time of bid closing, if any.

Agreement Term Sheet

Agreement Term Sheet means the terms, such as dates and values that form part of the Contract as stipulated in Appendix 1 to the Supplementary Conditions – Agreement Term Sheet.

Affiliate

Affiliate means, with respect to a *Person*, or *Person* who directly or indirectly controls, is controlled by, or is under direct or indirect common control with, such *Person*, and includes any *Person* in like relation to an *Affiliate*. A *Person* shall be deemed to “control” another *Person* if such *Person* possesses, directly or indirectly, the power to direct or cause the direction of the management and policies of such other *Person*, whether through the ownership of voting securities, by contract or otherwise; and the term “controlled” shall have a similar meaning. Without limiting the foregoing, any reference to an *Affiliate* of the *Owner* shall include any *Owner Entity*.

Applicable Law

Applicable Law means: (a) all laws, constitutions, treaties, statutes, codes, ordinances, orders, decrees, rules, regulations and by-laws which are or become in force during the performance of the *Work* and which relate to the *Project* or the *Work*, including the *Construction Act*, the *Environmental Protection Act*, the *OHSA* and the *WSIA*; (b) all judgments, orders, writs, injunctions, decisions, awards and directives of any *Governmental Authority* applicable to the *Project* or the *Work*; and (c) all policies, standards, guidelines, notices and protocols of any *Governmental Authority* applicable to the *Project* or the *Work*. For greater certainty, *Applicable Law* includes any restrictive covenants registered on title to the *Place of the Work*, the terms and conditions of any permit, authorization, certificate or approval issued by a *Governmental Authority* for the *Project* or the *Work*, and the terms and conditions of any official plan, zoning by-law, development agreement or site plan agreement related to the *Project* or the *Work*.

Arbitration Act

Arbitration Act means the *Arbitration Act*, 1991, SO 1991, c. 17, as amended from time to time, or its successor legislation, and includes all regulations enacted thereunder.

Background Reports

Background Reports means all reports, information and other documentation prepared by *Owner*, *Consultant*, and third parties referenced in the *Contract Documents* and made available to the Contractor regarding conditions at the *Place of the Work* and/or for performance of the *Work*.

Claims

Claims means any and all claims, liabilities, expenses, demands, losses, damages, actions, costs (including legal costs), interest, fines, suits, or proceedings of every nature and kind whatsoever.

Completion

Completion means when the price of completion of the *Work*, including correction of any known defects, is not more than the lesser of (i) one (1%) percent of the *Contract Price*; and (ii) \$5,000, as certified by the *Consultant* in accordance with this *Contract* and the *Payment Legislation*.

Completion Date

Completion Date means the date set out for achievement of *Completion* in the *Agreement Term Sheet*, as such date may be adjusted in accordance with the *Contract*.

Confidential Information

Confidential Information means this *Contract* and all information or material of the *Owner Entities* that is of a proprietary or confidential nature, whether it is identified as proprietary or confidential or not and whether in written, documentary, graphic, oral, electronic, computer readable and/or any other form whatsoever. *Confidential Information* includes:

- .1 any information concerning or related to this *Contract* or the business or affairs of any *Owner Entities*;
- .2 the prior and future discussions between *Contractor Personnel* and *Owner Entities* regarding any business transactions between them;
- .3 information concerning intellectual property, financial information, budgets, engineering and technical reports and information, environmental reports, *Project* design information, marketing plans and sales information, know-how, cost, *Deliverables*, architectural information, contractual arrangements including, terms of agreements with *Owner Entities*, all proprietary business information or personal information; and
- .4 information in any way derived by or generated by or which comes to the knowledge of the *Contractor Personnel* from such *Confidential Information*.

The following shall not be considered to be *Confidential Information*:

- .5 information that is or becomes publicly known through no wrongful act of the *Contractor* or *Contractor Personnel*;
- .6 information that the *Contractor* obtains from a third party that has the right to disclose it;
- .7 information that the *Contractor* can establish, by documentary evidence, was already known by the *Contractor* at the time of the initial disclosure of the *Confidential Information* by the *Owner* or *Consultant*; and
- .8 information that the *Contractor* can establish, by documentary evidence, was independently developed by or on behalf of the *Contractor* without reference to the *Confidential Information*.

Consequential Damages

Consequential Damages means (i) any consequential, incidental, special, punitive, exemplary or indirect damages, and (ii) damages of any kind, however caused or characterized, for loss of actual or anticipated revenue or profits, business interruption, loss of reputation, loss of use, loss of business opportunity, increased capital or operating costs, or increased financing costs.

Construction Act

Construction Act means the *Construction Act*, RSO 1990, c. C.30, as amended from time to time, or its successor legislation, and includes all regulations enacted thereunder.

Contractor IP

Contractor IP means all designs, processes, ideas, concepts, products, recommendations, suggestions, know-how, technical expertise, methods and all *Intellectual Property Rights* owned or developed by the *Contractor Personnel*.

Construction Schedule

The *Construction Schedule* means the schedule provided by the *Contractor* and approved by the *Consultant* pursuant to subparagraph 3.4.1.1.

Contractor Personnel

Contractor Personnel means the *Contractor* and all *Subcontractors* and *Suppliers* and any other *Persons* engaged by them to perform or supply any part of the *Work* or the *Contractor's* obligations under this *Contract*, including any employees, partners, officers, directors, agents, subcontractors, subconsultants, and other *Persons* for whom they are responsible at law.

COVID-19

COVID-19 means the SARS-CoV-2 novel coronavirus that causes the disease known as COVID-19 and includes any mutation or variant of such coronavirus.

Deliverables

Deliverables means all plans, sketches, designs, drawings, graphic representations, *Submittals*, specifications, notes, data, samples, materials, studies, reports, computer models, scale models, mock-ups, samples, reproducible and other documents and electronic data collected, developed or produced by the *Contractor Personnel* in performance of the *Work*, including all *Intellectual Property Rights* relating thereto, if any.

Effective Date

Effective Date means the date of this *Contract* as identified on the first page of the *Agreement*.

Environmental Consultant

Environmental Consultant means the professional consultant retained by the *Owner* that meets the qualifications of a “qualified person” as defined under the *Soil Regulations*.

Environmental Protection Act

Environmental Protection Act means the *Environmental Protection Act*, RSO 1990, c. E.19, as may be amended from time to time, or its successor legislation, and includes all regulations enacted thereunder.

Excess Soil

Excess Soil shall have the meaning given in the Soils Regulations.

Force Majeure Event

Force Majeure Event means any cause or event (other than bankruptcy, insolvency or lack of funds) which prevents performance by the *Contractor* of any of its obligations under the *Contract* in whole or in part and which further meets each of the following criteria: (a) the cause or event and its effects are beyond the *Contractor*'s reasonable control; (b) the *Contractor* could not reasonably have prevented, overcome, mitigated or removed the cause or event and its effects by commercially reasonable efforts and due diligence; and (c) the cause or event and its effects do not result from (i) the *Contractor*'s bankruptcy, insolvency, lack of funds or impecuniosity, (ii) act, omission or negligence of any *Contractor Personnel*, or (iii) breach of the *Contractor*'s obligations under this *Contract*. For certainty, a *Force Majeure Event* shall in no circumstance include (i) *COVID-19*, the *Pandemic* or a *Pandemic Change in Law* (including a *Governmental Response*), (ii) climatic or weather conditions other than *Abnormally Adverse Weather Conditions*, or (iii) economic, financial or market conditions or events.

Governmental Authority

Governmental Authority means (a) any federal, provincial, county, municipal, local or other governmental or public department, court, minister, governor-in-council, cabinet, commission, board, bureau, agency, commissioner, tribunal or instrumentality, (b) any subdivision or authority of any of the foregoing, and (c) any quasi-governmental or private body exercising any regulatory authority under or for the account of any of the foregoing. For certainty, *Governmental Authority* includes The Regional Municipality of Halton and the Municipality.

Governmental Response

Governmental Response means legislative amendments, controls, orders, requests and requirements imposed by *Governmental Authorities* in respect of or in response to *COVID-19* or the *Pandemic*. For certainty, *Governmental Response* includes a *Pandemic Change in Law* and the best practices recommended by the Ontario Ministry of Labour for construction site health and safety during the *Pandemic*.

Intellectual Property Rights

Intellectual Property Rights means all intellectual property rights (including rights in the nature of any copyright, trade mark, trade secret, service mark, design, drawing, patent, know-how, secret process and other similar proprietary rights, whether or not registered) and the rights to the registration of those rights and all rights or forms of protection of a similar nature or having equivalent or similar effect to any of these rights (and every renewal or extension of those rights) conferred under statute or common law or equity in any country.

MFIPPA

MFIPPA means the *Municipal Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. M.56, as amended from time to time, or its successor legislation, and includes all regulations enacted thereunder.

Municipality

Municipality means the lower-tier municipality of the *Place of the Work*.

Net Actual Cost

Net Actual Cost means the total cost of all labour and materials identified in paragraph 6.3.7, excluding *Value Added Taxes*, but including all other eligible taxes, and is the amount prior to the application of any mark-up or additional payment rate when determining the cost of the subject work.

Notice of Award

Notice of Award means *Notice in Writing* issued by the *Owner* to the *Contractor* directing them to commence performance of the *Work*.

OHSA

OHSA means the *Occupational Health and Safety Act*, R.S.O. 1990, c. O.1, as amended from time to time, or its successor legislation, and includes all regulations enacted thereunder.

Overhead

Overhead includes: (i) costs for all items in Division 01 of the *Specifications*; (ii) all site and head office overheads of all *Contractor Personnel*; (iii) financing costs; (iv) the salaries of superintendents, engineers, timekeepers, accountants, clerks, watch persons and all other site supervision staff above foreperson employed directly for the subject *Work*; (v) coordination with other trades affected; (vi) use of temporary offices, sheds and other general temporary site support facilities and all utilities used therein; and (vii) licences and permits other than those specific to a particular item of the *Work*. For certainty, *Overhead* includes all costs not expressly included in valuation of a change in paragraph 6.3.7.

Owner's Agent

Owner's Agent means the person or entity identified as such in the *Agreement Term Sheet*, if any.

Owner Entities

Owner Entities means the *Owner*, the *Owner's Agent* and the *Municipality*, including any employees, partners, officers, directors, agents, Members of Regional Council, and other Persons for whom they are responsible at law.

Owner Personnel

Owner Personnel means the *Owner*, the *Owner's Agent*, the *Consultant*, all *Other Contractors* and any other *Persons* engaged by them in respect of the *Work*, the *Project* or the *Owner's* obligations under this *Contract*, including any employees, partners, officers, directors, agents, subcontractors, subconsultants, and other *Persons* for whom they are responsible at law.

Pandemic

Pandemic means the *COVID-19* pandemic declared by the World Health Organization to be a pandemic on March 11, 2020, and shall include such continuing or resurgent effects of *COVID-19* upon public health as may persist notwithstanding that it may no longer constitute a declared pandemic or other public health emergency as of the *Effective Date*.

Pandemic Change in Law

Pandemic Change in Law means any change, amendment, modification, repeal or replacement in *Applicable Law* or a *Governmental Response* that: (i) came into effect after the *Effective Date*; (ii) is directly resultant from or related to the *Pandemic* or the occurrence, control or spread of *COVID-19*; and (iii) directly affects performance of the *Work*, including the *Contract Time* or the *Contract Price*. For certainty, a *Pandemic Change in Law* includes any obligation to delay commencement or suspend performance of the *Work* due to a *Governmental Response* coming into effect after the *Effective Date*.

Person

Person includes an individual, a corporation, a partnership, a trust, an unincorporated organization, a *Governmental Authority*, and the executors, administrators or other legal representatives of an individual in such capacity.

Phase of the Work

Phase of the Work has the meaning given in paragraph 5.4.7.

Proper Invoice

Proper Invoice means an application for payment that includes each of the elements listed in Appendix 2 to the Supplementary Conditions – Proper Invoice Requirements.

Ready-for-Takeover Date

Ready-for-Takeover Date means the date set out for achievement of *Ready-for-Takeover* in the *Agreement Term Sheet*, as such date may be adjusted in accordance with the *Contract*.

Soil Regulations

Soil Regulations means Ontario Regulation 406/19 – On-Site and Excess Soil Management as made under the *Environmental Protection Act*, as may be amended from time to time, or its successor regulation.

Submittals

Submittals are documents or items required by the *Contract Documents* to be provided by the *Contractor*, including *Shop Drawings*, samples, models, mock-ups, as-built drawings and operation and maintenance manuals.

Standard of Care

Standard of Care means the standard of care, competence, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar work and services for a project of similar size, scope, complexity, quality and prestige as the Project and in the same or similar locality as the Project.

Warranty Period

Warranty Period has the meaning given in paragraph 12.3.1.

Warranty Security

Warranty Security has the meaning given in paragraph 4.6 of Article A-4.

WSIA

WSIA means the *Workplace Safety and Insurance Act, 1997*, S.O. 1997, c. 16, Sched. A, as amended from time to time, or its successor legislation, and shall include all regulations enacted thereunder.

WSIB

WSIB means the Workplace Safety & Insurance Board of Ontario, which operates under the authority of the *WSIA*.”

GENERAL CONDITIONS

GC 1.1 CONTRACT DOCUMENTS

SC-13 Delete paragraphs 1.1.3 and 1.1.4 in their entirety and replace them with the following:

“1.1.3 The *Contractor* shall in accordance with the *Standard of Care* review the *Contract Documents* for the purpose of facilitating co-ordination and execution of the *Work* by the *Contractor*. The *Contractor* shall report promptly to the *Consultant* any ambiguities, design issues or other matters requiring clarification made known to the *Contractor* or that the *Contractor* may discover from such a review.

1.1.4 Except for its obligation to review the *Contract Documents* and report the result pursuant to paragraph 1.1.3, the *Contractor* is not responsible for ambiguities, design issues or other matters requiring clarification in the *Contract Documents* and does not assume any responsibility to the *Owner* or to the *Consultant* for the accuracy of the *Contract Documents*. Without limiting the foregoing, the *Contractor* shall not be liable for any damages or costs resulting from any ambiguities, design issues or other matters requiring clarification in the *Contract Documents* which the *Contractor* could not reasonably have discovered from such a review in accordance with the *Standard of Care*. If the *Contractor* does discover any ambiguities, design issues or other matters requiring clarification in the *Contract Documents*, the *Contractor* shall notify the *Owner* and *Consultant* in writing and not proceed with the work affected until the *Contractor* has received modified or additional information from the *Consultant* or *Owner* in writing. The impacts of any ambiguities, design issues or other matters requiring clarification in the *Contract Documents*, including to the *Contract Price* and *Contract Time*, shall be addressed by the parties in accordance with Part 6 – CHANGES.”

SC-14 Delete subparagraph 1.1.5.1 in its entirety and replace it with the following:

“.1 the order of priority of documents, from highest to lowest, shall be:

- Appendix 1 to the Supplementary Conditions – *Agreement Term Sheet*
- *Addenda*
- the Agreement between *Owner* and *Contractor*, as amended by the Supplementary Conditions
- the Definitions, as amended by the Supplementary Conditions
- the General Conditions, as amended by the Supplementary Conditions
- Appendix 2 to the Supplementary Conditions – Proper Invoice Requirements
- Appendix 3 to the Supplementary Conditions – Insurance
- Division 01 of the *Specifications*
- technical *Specifications*
- material and finishing schedules
- the *Drawings*
- *Background Reports*”

SC-15 Add the following to the end of subparagraph 1.1.6.2 after the words “the *Work*”:

“, except to the extent the *Consultant* is indemnified as a third party beneficiary as provided in subparagraphs 9.2.7.4 and 9.5.3.4 and in paragraph 13.1.1.”

SC-16 Add new paragraph 1.1.12 as follows:

“1.1.2 The parties acknowledge and agree that this *Contract* represents the entire agreement between the parties in respect of the *Work* and the *Project* and no document shall form part of the *Contract Document* unless expressly identified in Article A-3. For certainty, no letter of intent, purchase order or work order issued by the *Owner* in respect of any of the *Contract*, the *Work* or the *Project* shall form part of the *Contract Documents* and no terms or conditions therein, if any, shall be of any force and effect.”

GC 1.4 ASSIGNMENT

SC-17 Delete paragraph 1.4.1 in its entirety and replace it with the following:

“1.4.1 The *Contractor* shall not assign, transfer or novate all or any part of the *Contract* without the written consent of the *Owner*, which consent may be withheld in the *Owner*'s sole and absolute discretion. The *Owner* may assign, transfer or novate all or a portion of this *Contract* or any right, benefit or interest in all or any portion of this *Contract*, to any *Affiliate* or to any purchaser of all or part of the *Place of the Work* or *Project* in its sole discretion. The *Owner* shall otherwise not assign, transfer or novate all or any portion of the *Contract* without the written consent of the *Contractor*, which consent shall not be unreasonably withheld.”

GC 2.2 ROLE OF THE CONSULTANT

SC-18 Delete the second sentence in paragraph 2.2.3 in its entirety and replace it with the following:

“The duties, responsibilities and limitations of authority of such project representatives shall be those of the *Consultant* as described in the *Contract Documents*.”

SC-19 In the first line of paragraph 2.2.6, delete the words “Except with respect to GC 5.1 – Financing Information Required by the *Owner*,”.

SC-20 In paragraph 2.2.8:

(1) in both the first and second sentences add the words “, written statements” after the word “interpretations”; and

(2) add the following to the end:

“The *Owner* and the *Contractor* shall waive any claims against the *Consultant* arising out of its making of any interpretations, written statements or findings in accordance with paragraphs 2.2.6, 2.2.7, 2.2.8, and 7.1.2, but only to the extent that any such interpretations, written statements, and findings are made by the *Consultant* in an unbiased manner and in accordance with the *Consultant*'s professional standard of care at law.”

SC-21 In paragraph 2.2.18 delete the word “immediately” and add the following to the end “Notwithstanding the foregoing, while the *Owner* will consider any reasonable objections of the *Contractor*, the *Owner* shall have absolute discretion in its appointment of a new *Consultant*.”

GC 2.3 REVIEW AND INSPECTION OF THE WORK

SC-22 In the second sentence of paragraph 2.3.1 add the words “and the *Owner*” immediately following the words “the *Consultant*”.

GC 2.4 DEFECTIVE WORK

SC-23 Delete paragraph 2.4.1 in its entirety and replace it with the following:

“2.4.1 The *Contractor* shall promptly correct at its expense and in a manner acceptable to the *Owner* and *Consultant* defective work that has been rejected by the *Consultant* or *Owner* as failing to conform to the *Contract Documents* whether or not specifically identified by the *Consultant* or *Owner* and whether or not the defective work was incorporated in the *Work* or the defect is the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the *Contractor*. The *Contractor* shall prioritize the correction of any defective work which, in the sole discretion of the *Owner*, adversely affects the day-to-day operations of the *Owner*, including as required by paragraph 12.3.4, and shall otherwise prioritize the correction of defective work as required so as not to interfere with, or derogate from, the *Construction Schedule*. Subject to paragraph 2.4.3 and without prejudice to any other right or remedy under this *Contract* or at law and without affecting the warranty period, if the *Contractor* fails to correct such defective work within a reasonable amount of time as determined by the *Consultant*, the *Owner* may have such defective work corrected by its own forces or *Other Contractors* at the *Contractor*’s expense. Any testing (including retesting by the *Owner*) to ensure that the defective work has been corrected and complies with the *Contract Documents* shall also be carried out at the *Contractor*’s expense. The *Contractor* shall not be entitled to any adjustment of the *Contract Time* for correction of defective work and the *Owner* may deduct any expenses incurred pursuant to this paragraph 2.4.1 from any amounts due and owing to the *Contractor* under this *Contract*.”

GC 2.5 OWNER’S AGENT

SC-24 Add new GC 2.5 – OWNER’S AGENT as follows:

“GC 2.5 OWNER’S AGENT

2.5.1 The *Owner’s Agent* shall have the authority to exercise all rights and obligations of the *Owner* under this *Contract*.

- 2.5.2 Subject to any notified limitations in authority, the *Contractor* may rely upon any written instructions or directions provided by the *Owner's Agent*. Neither the authority of the *Owner's Agent* to act, nor any decision to exercise or not exercise such authority, shall give rise to any duty or responsibility of the *Owner's Agent* to any *Contractor Personnel*.”

GC 3.1 CONTROL OF THE WORK

SC-25 Add new paragraphs 3.1.3 to 3.1.6 as follows:

- “3.1.3 Prior to commencing individual fabrication and construction activities, the *Contractor* shall verify, at the *Place of the Work*, all relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the *Work* and shall further carefully compare such field measurements and conditions with the requirements of the *Contract Documents*. Where such verification is not possible prior to fabrication or construction within the *Contract Time*, or dimensions are not included or contradictions exist, or exact locations are not apparent, the *Contractor* shall immediately notify the *Consultant* in writing and obtain written instructions from the *Consultant* before proceeding with any part of the affected work.
- 3.1.4 To the extent applicable, the *Contractor* shall in consultation with the *Owner* schedule, coordinate and perform the *Work* as required to prevent or, where prevention is not possible, to minimize, any impacts to the *Owner's* continuing business operations.
- 3.1.5 The *Contractor* and its *Subcontractors* shall attend meetings with respect to the *Work* as may be directed by the *Consultant* or *Owner*. The *Contractor* shall not claim any extra compensation for attendance at these meetings. The *Contractor* and its *Subcontractors* shall provide competent representatives to attend such meetings who are authorized to make undertakings on their behalves.
- 3.1.6 Prior to commencement of the *Work* the *Contractor* shall provide to the *Owner* certificates of insurance evidencing coverage as required by this *Contract*, a clearance certificate from the *WSIB* stating that all amounts owed to date have been paid in full.”

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

SC-26 In paragraph 3.2.1 add the words “or for other work at the *Place of the Work*” after the words “the *Project*”.

SC-27 Delete subparagraph 3.2.2.1 in its entirety and replace it with the following:

- “.1 cause such *Other Contractors* and *Owner’s* own forces to comply with the instructions of the *Contractor* relating to coordination and scheduling of the activities and work of such *Other Contractors* and the *Owner’s* own forces at the *Place of the Work* with the *Work of the Contract*.”

GC 3.4 CONSTRUCTION SCHEDULE

SC-28 Delete paragraph 3.4.1 in its entirety and replace it with the following:

“3.4.1 The *Contractor* shall:

- .1 prepare and submit to the *Owner* and the *Consultant* ten (10) *Working Days* after receipt of the *Notice of Award* a construction schedule that meets all requirements of the *Contract Documents* and that indicates the timing of the major activities of the *Work* and provides sufficient detail of the critical events and their interrelationship to demonstrate the *Work* will be performed in conformity with the *Contract Time*. Upon the *Consultant’s* acceptance of such schedule in writing, in consultation with the *Owner*, it shall become the *Construction Schedule*;
- .2 make the native form of the *Construction Schedule* available to the *Owner* and *Consultant* upon request;
- .3 complete the *Work* in accordance with the *Construction Schedule* and provide the expertise and resources, including manpower and *Construction Equipment*, as necessary to maintain progress under the *Construction Schedule*;
- .4 monitor the progress of the *Work* on a bi-weekly basis relative to the *Construction Schedule* and advise the *Consultant* and the *Owner* bi-weekly in writing of any variation from or slippage in performance of the *Work* in accordance with the *Construction Schedule*, together with a detailed explanation of any delays and a plan to mitigate the delay;
- .5 advise the *Consultant* of any revisions required to the *Construction Schedule* as the result of extensions of the *Contract Time* as provided in Article A-10 and Part 6 – CHANGES IN THE WORK;

- .6 update and submit to the *Consultant* and *Owner* an electronic copy of an updated *Construction Schedule* on a monthly basis and upon request by the *Consultant* or *Owner*, which submission shall include a comparison of the updated *Construction Schedule* to the accepted *Construction Schedule*, a summary of actual and forecast progress of the *Work* relative to the *Construction Schedule*, and a description of the basis of and logic for any changes made to the *Construction Schedule* in conformance to requirements of the *Contract Documents*; and
- .7 subject to Article A-10 and Part 6 – CHANGES IN THE WORK, provide overtime work without adjustment to the *Contract Price* if such work is deemed necessary to mitigate delay and/or recoup lost time in order to meet the *Construction Schedule*.”

SC-29 Add new paragraph 3.4.2 as follows:

“3.4.2 At the time of commencement of the *Work*, the *Contractor* shall prepare for the review and acceptance of the *Owner* and the *Consultant* a schedule indicating the times within the *Construction Schedule* that *Products* specified to be purchased by the *Owner* and installed or connected by the *Contractor* are required to be delivered to the *Place of the Work* to allow for performance of the *Work* within the *Contract Time* and avoid delaying the progress of the *Work*.”

GC 3.6 SUBCONTRACTORS AND SUPPLIERS

SC-30 Add the following to paragraph 3.6.2:

“The *Contractor* agrees not to change any such *Subcontractors* without the prior written consent of the *Owner*, such consent not to be unreasonably withheld.”

SC-31 Add the following new paragraph 3.6.7 to 3.6.8:

“3.6.7 Ten (10) *Working Days* after receipt of the *Notice of Award* the *Contractor* shall submit to the *Owner* a list of all *Subcontractors* proposed to perform the *Work* and the names of all senior staff of the *Contractor* that will perform, supervise and coordinate the *Work*.

3.6.8 Notwithstanding any other term in this *Contract*, under no circumstance shall the *Contractor* employ as a *Subcontractor* or *Supplier* any *Person* identified on the *Owner’s* list of suspended subcontractors and suppliers which list is available online here: [<https://www.halton.ca/The-Region/Finance-and-Transparency/Doing-Business-with-the-Region>]. The *Contractor* shall not be entitled to adjustment of the *Contract Price* or *Contract Time* where it is required to change a proposed *Subcontractor* or *Supplier* due to their inclusion on such list. The *Contractor* shall also prohibit its *Subcontractors* and *Suppliers* from employing for the *Project* any such *Persons*.”

GC 3.7 LABOUR AND PRODUCTS

SC-32 Add the following to the end of paragraph 3.7.1:

“The *Contractor* represents that it has sufficient skilled employees to replace, subject to the *Owner*’s approval, acting reasonably, its designated supervisor and project manager in the event of death, incapacity, removal or resignation.”

SC-33 Add paragraphs 3.7.4 to 3.7.9 as follows:

“3.7.4 Ten (10) *Working Days* after receipt of the *Notice of Award* the *Contractor* shall submit to the *Owner* and *Consultant* an itemized list of *Suppliers* and manufacturers for *Products* that are to be supplied for the *Work* as specified in the *Contract Documents*. The *Contractor* shall provide the specification section reference, description of the *Product*, manufacturer, *Supplier* and any other information requested by the *Owner* or *Consultant*. Upon acceptance of such list by the *Owner* the *Contractor* agrees to use the *Products* specified in such approved itemized list.

3.7.5 All products and materials existing at the *Place of the Work* as of the *Effective Date* shall remain the property of the *Owner*. All *Products* to be incorporated in the *Work* shall become the property of the *Owner* at the earlier of: (i) incorporation of the *Product* into the *Work*; and (ii) payment in whole or in part for the *Product* by the *Owner*. Notwithstanding transfer of title and ownership to the *Owner*, the *Contractor* shall remain responsible for any loss or damage to *Products* until *Ready-for-Takeover* has been achieved.

3.7.6 All *Products* which are specified in the *Contract Documents* by their proprietary names or by part or catalogue numbers, are to form the basis for the specifications of such *Products*. No substitute for any such *Products* may be used without the *Consultant*’s written approval, acting reasonably. Substitutes for *Products* specified in the *Contract Documents* or approved by the *Owner* pursuant to paragraph 3.7.4 will be permitted only when: (i) request for the substitution is submitted in sufficient time to permit proper investigation and written approval by the *Consultant*, acting reasonably; and (ii) the specified *Product* has been discontinued, is unavailable or, due to such *Product*’s delivery being on the critical path it cannot be delivered within the time required for performance of the *Work* within the *Contract Time*. When requesting approval for the use of substitutes, the *Contractor* shall include in its submission sufficient details regarding the subject *Product*’s discontinuance, availability or impact on the critical path, as applicable, together with a description of any effect (increase or decrease) that the substitution may have on the *Contract Price* and, if applicable, written approval from all *Governmental Authorities*. No adjustment to the *Contract Time* shall result from the use of substitutes by the *Contractor*.

- 3.7.7 Where the *Contractor* is of the reasonable opinion that advanced payment for a *Product* is required to secure such *Product*'s timely supply and delivery to the *Place of the Work* in compliance with the *Construction Schedule* and *Contract Time*, the *Contractor* may seek consent from the *Owner* to include application for payment for such *Product* in a *Proper Invoice* prior to its incorporation into the *Work* by *Notice in Writing* to the *Owner* and *Consultant*, which *Notice in Writing* shall include a description of the circumstances giving rise to the need for such advanced payment and identifying whether the stockpiling or storage of such *Products* at the *Place of the Work* will be required pursuant to paragraph 3.7.8. With any *Proper Invoice* seeking advanced payment (as approved by the *Owner* pursuant to this paragraph 3.7.7), the *Contractor* shall include a receipt with proof of payment for the *Product* or such other documentation as reasonably required by the *Owner* to confirm payment by the *Contractor* for such *Product*. The *Owner* may approve or refuse any request for advanced payment for *Products* in its sole and absolute discretion.
- 3.7.8 No *Products* shall be stockpiled or stored at the *Place of the Work* before their anticipated incorporation into the *Work* unless, in the reasonable opinion of the *Consultant* and the *Owner*, the stockpiling or storage of such *Products* at the *Place of the Work* is feasible and necessary or desirable, including because of advanced payment for such *Products* as approved by the *Owner* pursuant to paragraph 3.7.6, then the *Contractor* shall obtain the prior written approval of the *Owner* for stock piling or storage of *Products* at the *Place of the Work*. The *Contractor* acknowledges and accepts that the *Owner* may not have space for storage of *Products* at the *Place of the Work* and, as such, the *Contractor* agrees that the *Owner* shall not have any obligation to permit the stockpiling or storage of *Products* at the *Place of the Work*. Where the *Owner* does not approve storage of *Products* at the *Place of the Work*, the *Contractor* may elect at its sole cost to store such *Products* at an alternate location. The *Contractor* shall remove all surplus or rejected *Products* from the *Place of the Work*.
- 3.7.9 Where the *Owner* has made payment to the *Contractor* for *Products* prior to their delivery to the *Place of the Work*, at no additional cost to the *Owner*, the *Contractor* shall:
- .1 provide the *Owner* with an executed receipt clearly identifying the *Owner* as the owner of the subject *Products* together with any available identifying information for such *Products*, such as serial numbers;
 - .2 ensure that the *Products* are clearly marked, identified or labelled as being the property of the *Owner* during any storage or transport of such *Products*;

- .3 ensure that when such *Products* are stored at a location other than the *Place of the Work* they are kept in a segregated location and not intermingled or co-mingled with the property of the *Contractor* or any other person;
- .4 ensure that the *Owner* and *Consultant* have the right to access, examine and inspect such *Products*; and
- .5 ensure that such *Products* are not subject to any landlord distress rights, security interest or other encumbrance by any person.”

GC 3.8 SHOP DRAWINGS

SC-34 Add the words “AND OTHER SUBMITTALS” to the title of GC 3.8 after the words “SHOP DRAWINGS”.

SC-35 Add the words “and other *Submittals*” after the words “*Shop Drawings*” in paragraphs 3.8.1, 3.8.2, 3.8.3, 3.8.3.2, 3.8.5, 3.8.6, and 3.8.7.

GC 3.9 CLEAN-UP

GC 3.10 DOCUMENTS AT THE SITE

GC 3.11 USE OF THE WORK

GC 3.12 CUTTING AND REMEDIAL WORK

GC 3.13 EXCESS SOILS

SC-36 Add the following new GC 3.9 CLEAN-UP, GC 3.10 DOCUMENTS AT THE SITE; GC 3.11 USE OF THE WORK, GC 3.12 CUTTING AND REMEDIAL WORK and GC 3.13 EXCESS SOILS:

“GC 3.9 CLEAN-UP

- 3.9.1 The *Contractor* shall maintain the *Work* in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the *Owner Personnel*, *Other Contractors* or their employees.”
- 3.9.2 Before applying for *Substantial Performance* as provided in GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK, the *Contractor* shall remove waste products and debris, other than that resulting from the work of *Owner Personnel*, *Other Contractors* or their employees and shall leave the *Place of the Work* clean and suitable for use and occupancy by the *Owner*. The *Contractor* shall remove materials, tools, *Construction Equipment*, and *Temporary Work* not required for the performance of the remaining work.

- 3.9.3 Prior to submitting its *Proper Invoice* for final payment, the *Contractor* shall remove any remaining materials, tools, *Construction Equipment*, *Temporary Work*, and waste products and debris, other than those resulting from the work of *Owner Personnel*, *Other Contractors* or their employees.
- 3.9.4 All debris and waste resulting from the *Work* shall be removed from the *Place of the Work* expeditiously and shall be disposed of in accordance with the *Contract Documents* and *Applicable Law*. Salvage or materials from the *Work* shall not be sold at or near the *Place of the Work*.
- 3.9.5 In the event that the *Owner* or any *Governmental Authority* orders, instructs or requests that the *Owner* or *Contractor* clean-up the *Place of the Work* or any property adjacent to or in proximity to the *Place of the Work*, the *Contractor* shall be responsible for the prompt completion of such clean-up activities at its sole cost, provided that the requirement for such clean-up is related to or arises from the *Work* and except to the extent such clean-up is required due to the work of *Owner Personnel*, *Other Contractors* or their employees.
- 3.9.6 The *Owner* shall have the right to back charge the costs of cleaning required to be performed by the *Contractor* pursuant to this GC 3.9 if not done by the *Contractor* within forty eight (48) hours of receipt of written notice from the *Owner* or *Consultant*.”

GC 3.10 DOCUMENTS AT THE SITE

- 3.10.1 The *Contractor* shall keep one copy of current *Contract Documents*, submittals, reports, and records of meetings at the *Place of the Work*, in good order and available to the *Owner* and the *Consultant*.

GC 3.11 USE OF THE WORK

- 3.11.1 The *Contractor* shall confine *Construction Equipment*, *Temporary Work*, storage of *Products*, waste products and debris, and operations of *Contractor Personnel* to limits indicated by laws, ordinances, permits, or the *Contract Documents* and shall not unreasonably encumber the *Place of the Work*.

GC 3.12 CUTTING AND REMEDIAL WORK

- 3.12.1 The *Contractor* shall perform the cutting and remedial work required to make the affected parts of the *Work* come together properly.
- 3.12.2 The *Contractor* shall co-ordinate the *Work* to ensure that the cutting and remedial work is kept to a minimum.
- 3.12.3 Cutting and remedial work shall be performed by specialists familiar with the *Products* affected and shall be performed in a manner to neither damage nor endanger the *Work*.

GC 3.13 EXCESS SOILS

3.13 The *Contractor* expressly acknowledges that, where the *Project* involves *Excess Soil*, *Applicable Law* shall include the *Soil Regulations*. In such case, notwithstanding that the *Owner* may be a “Project Leader” as defined under the *Soil Regulations*, the *Contractor* expressly agrees and acknowledges that the *Work* includes assumption, performance, and fulfillment of all liabilities, responsibilities and obligations of the Project Leader applicable to *Excess Soil* as set out in the *Contract Documents*. Without limiting the foregoing, in performance of the *Work* and its obligations under this *Contract* the *Contractor* shall coordinate and consult with the *Owner*, *Consultant* and *Environmental Consultant* as required to ensure compliance of the *Project* with the *Soil Regulations*.”

GC 4.1 CASH ALLOWANCES PAYMENT

SC-37 Delete paragraph 4.1.7 in its entirety and replace it with the following:

“4.1.7 At the commencement of the *Work*, the *Contractor* shall prepare for the review and acceptance of the *Owner* and the *Consultant* a schedule indicating the times within the *Construction Schedule* that items called for under cash allowances are required to be delivered to the *Place of the Work* to avoid delaying the progress of the *Work*.”

SC-38 Add new paragraph 4.1.8 in as follows:

“4.1.8 The *Owner* reserves the right to call, or to have the *Contractor* call, for competitive bids for portions of the *Work* to be paid for from cash allowances.”

GC 4.2 CONTINGENCY ALLOWANCE

SC-39 Add the following to the end of paragraph 4.2.4:

“For certainty, prior to *Contractor*’s submission of its *Proper Invoice* for final payment the *Contract Price* shall be reduced by the amount of any contingency allowance not authorized for expenditure under paragraph 4.2.3.”

SC-40 Add new GC 4.3 PROVISIONAL ITEMS ALLOWANCE as follows:

“GC 4.3 PROVISIONAL ITEMS ALLOWANCE

4.3.1 The *Contract Price* includes the amount of the provisional items allowance, if any, stated in the *Contract Documents*.

4.3.2 The provisional item allowance includes the *Contractor*’s overhead and profit in connection with such provisional items.

- 4.3.3 Expenditures under the provisional items allowance shall be authorized and valued as provided in GC 6.1 – OWNER’S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 4.2.4 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the expenditures authorized under paragraph 4.3.3 and the amount of the provisional items allowance. For certainty, prior to *Contractor’s* submission of its *Proper Invoice* for final payment the *Contract Price* shall be reduced by the amount of any provisional items allowance not authorized for expenditure under paragraph 4.3.3.”

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

SC-41 Delete GC 5.1 in its entirety and replace it with the following:

“GC 5.1 – DRAFT APPLICATIONS FOR PAYMENT

- 5.1.1 Except as stipulated in paragraph 5.1.2, on a monthly basis and no earlier than five (5) *Working Days* after the end of the applicable monthly payment period, the *Contractor* shall submit to the *Consultant* and the *Owner* a draft application for payment for the value of the *Work* performed up to the end of the subject monthly payment period. The draft application for payment shall be in the form of the *Proper Invoice Template*. The draft application for payment must contain all information and documentation required for a *Proper Invoice* as stipulated in Appendix 2 – Proper Invoice Requirements.
- 5.1.2 The *Contractor* shall not submit a draft application for payment between December 24 and January 2 inclusive or on any day that is not a *Working Day*.
- 5.1.3 The *Contractor* shall be available upon request of the *Owner* or *Consultant* to meet and review the draft application for payment prior to *Contractor’s* submission of the corresponding *Proper Invoice*.
- 5.1.4 All draft applications for payment and *Proper Invoices* shall be submitted by email to the *Owner* and *Consultant* at the email addresses stipulated in the *Agreement Term Sheet* and all such email messages shall include:
- .1 the sender’s name, address, telephone number, fax number, if any, and e-mail address;
 - .2 the date and time of transmission; and
 - .3 the name and telephone number of a person to contact in the event of a transmission problem.

- 5.1.5 Where a draft application for payment or *Proper Invoice* is given by email between 4:00 p.m. and midnight, it shall be deemed to have been given on the following day.”

GC 5.2 APPLICATIONS FOR PAYMENT

SC-42 Delete paragraph 5.2.1 in its entirety and replace it with the following:

“5.2.1 A minimum of five (5) Working Days following the Contractor’s submission of a draft application for payment pursuant to GC 5.1 the Contractor shall submit a Proper Invoice to the Consultant and the Owner on account as provided in Article A-5 of the Agreement which Proper Invoice shall be for Work for the value of the Work performed up to the end of the subject monthly payment period. All Proper Invoices shall be submitted in accordance with paragraphs 5.1.4 and 5.1.5. Notwithstanding any other term of the Contract, including paragraph 5.1.2, the Contractor shall not submit a Proper Invoice between November 22 and January 2 inclusive or on any day that is not a *Working Day*. For certainty, application for payment in respect of the *Warranty Security* shall only be made upon satisfaction of all stipulated requirements for this milestone as set out in paragraph 12.3.8.”

SC-43 Delete paragraph 5.2.2 in its entirety.

SC-44 In paragraph 5.2.3 add the words “in a *Proper Invoice*” after the words “The amount claimed” and add the following to the end:

“The amount applied for in the *Proper Invoice* for payment of the *Warranty Security* upon satisfaction of all requirements set out in paragraph 12.3.8 shall be comprised of the amount of the *Warranty Security* less any deductions to such security applied in accordance with this *Contract*.”

SC-45 Delete paragraph 5.2.4 in its entirety and replace it with the following:

“5.2.4 At least 15 calendar days before submission of its first *Proper Invoice* the Contractor shall submit to the Consultant, in a form acceptable to the Owner and Consultant, acting reasonably, a schedule of values for the parts of the Work, aggregating the total amount of the *Contract Price*, so as to facilitate evaluation of *Proper Invoices*.”

SC-46 Amend paragraph 5.2.6 by replacing the words “Applications for payment” with the words “*Proper Invoices*”.

SC-47 Delete paragraph 5.2.7 in its entirety.

GC 5.3 PAYMENT

SC-48 In paragraph 5.3.1 replace the words “an application for payment” with “a *Proper Invoice*”.

SC-49 Delete subparagraph 5.3.1.1 in its entirety and replace it with the following:

“.1 If the *Consultant*, in consultation with the *Owner*, determines that an amount different than that applied for is properly due, the *Owner* or *Consultant* shall issue a “Notice of Non-Payment” pursuant to the *Construction Act* on behalf of the *Owner*.”

SC-50 Delete subparagraph 5.3.1.2 in its entirety and replace it with the following:

“.2 Subject to any “Notice of Non-Payment” issued pursuant to the *Construction Act* on behalf of the *Owner*, the *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement – PAYMENT no later than twenty-eight (28) calendar days from the date of receipt of such *Proper Invoice* and, in any event, in compliance with the *Payment Legislation*.”

SC-51 Add new paragraphs 5.3.2 to 5.3.5 as follows:

“5.3.2 If the *Contractor* fails to provide any element of a *Proper Invoice*, including a statutory declaration or the workers’ compensation clearance certificate, the application for payment will not constitute a *Proper Invoice* and the *Owner* shall not be required to make payment to the *Contractor* until a complete *Proper Invoice* is submitted.

5.3.3 The *Contractor* shall have no entitlement to payment and no *Proper Invoice* may be submitted for changes in the *Work* without a written *Change Order* issued by the *Owner*.

5.3.4 The *Owner* may withhold from payment amounts as determined by the *Owner* or *Consultant*, acting reasonably, to ensure correction of defective work and may also provide for the retention of amounts in addition to the statutory holdback provided for in the *Contract* sufficient to protect the *Owner* against all liens of which the *Owner* has notice.

5.3.5 Following receipt by the *Contractor* of statutory declarations from *Suppliers* or *Subcontractors* of any tier, the *Contractor* shall promptly provide the *Owner* and *Consultant* with copies of such statutory declarations.”

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

SC-52 Delete all paragraphs of GC 5.4 in their entirety and replace them with the following:

- “5.4.1 When the *Contractor* considers that *Substantial Performance of the Work* has been achieved, or if permitted by the *Payment Legislation* a designated portion of the *Work* which the *Owner* agrees to accept separately is substantially performed, the *Contractor* shall, within five (5) *Working Days*, deliver to the *Consultant* and to the *Owner* a written application for a review by the *Consultant* to establish *Substantial Performance of the Work* or substantial performance of the designated portion of the *Work*, which application shall include the following:
- a. A comprehensive list of work to be completed or corrected including all deficient or defective work identified by the *Owner* and *Consultant* and the cost for completion and correction of such work,
 - b. A list of work which cannot be performed for reasons beyond the control of the *Contractor* including the proposed date for completion of such work and the cost for completion of such work,
 - c. A declaration to the effect that:
 - i. the *Contract* is substantially performed,
 - ii. the performance of the balance of the *Contract* is in progress, and
 - iii. where the balance of the *Contract*, or a part or parts thereof cannot be performed forthwith, but must be deferred for reasons beyond the control of the *Contractor*, the balance of the *Contract* shall be completed by a fixed date,
 - d. All documentation required pursuant to GC 10.4 – WORKERS’ COMPENSATION, including a clearance certificate from the *WSIB* stating that all amounts owed to the date of *Substantial Performance of the Work* have been paid in full,
 - e. A statutory declaration using the latest CCDC 9A form of “Statutory Declaration of Progress Payment Distribution by Contractor”,
 - f. A list of all outstanding or potential *Claims* of the *Contractor* under the *Contract* as of the date of its application for *Substantial Performance of the Work*. For certainty, the provision of this list shall in no way relieve the *Contractor* of its notice obligations under the *Contract* for any *Claim*,

- g. A statement identifying the value of *Work* done to the proposed date of *Substantial Performance of the Work* together with all documentation reasonably required by the *Owner* and *Consultant* to determine the value of same, and
- h. A statement showing the amount of holdback monies due for release and payment when all liens that may be claimed against such holdback have expired or been satisfied, discharged or otherwise provided for under the *Payment Legislation*.

Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.

5.4.2 The *Consultant* will review the *Work* to certify or verify the validity of the application and shall promptly, and in any event, no later than 15 *Working Days* after receipt of the *Contractor's* application:

- .1 advise the *Contractor* in writing that the *Work* or the designated portion of the *Work* is not substantially performed and give reasons why, or
- .2 state the date of *Substantial Performance of the Work* or a designated portion of the *Work* in a certificate and issue a copy of that certificate to each of the *Owner* and the *Contractor*.

For certainty, the *Contract Price* to be used in determining achievement of *Substantial Performance of the Work* shall be the *Contract Price* as amended by any *Change Orders* issued as of the date such determination is being made and shall not include any anticipated changes to the *Contract Price* not yet confirmed by *Change Order*, including in respect of any cash allowances or contingencies.

5.4.3 Within no more than 7 calendar days following receipt of the certificate from the *Consultant* pursuant to paragraph 5.4.2, the *Contractor* shall cause such certificate to be published in accordance with the requirements of the *Payment Legislation* and the *Contractor* shall issue to the *Owner* and *Consultant* an application for release of the holdback. The *Contractor's* application for release of the holdback application shall include:

- .1 a copy of the advertisement containing the certificate of *Substantial Performance of the Work* placed by the *Contractor* in the appropriate construction trade newspaper;
- .2 a declaration that no written notices of lien have been received by the *Contractor*;

- .3 all documentation required pursuant to GC 10.4 – WORKERS’ COMPENSATION, including a clearance certificate from the *WSIB* stating that all amounts owed to the date of *Substantial Performance of the Work* have been paid in full; and
- .4 a statutory declaration using the latest CCDC 9A form of “Statutory Declaration of Progress Payment Distribution by Contractor”.

Except to the extent required by *Payment Legislation*, such application for release of the holdback shall not constitute an application for payment that is subject to *Proper Invoice* requirements. All holdback amounts prescribed by the *Payment Legislation* shall become due and payable to the *Contractor* following expiration of the holdback period stipulated in the *Payment Legislation* provided that all liens that may be claimed against the holdback have expired or been satisfied, discharged or otherwise provided for as required by the *Payment Legislation*.

5.4.4 There shall be no progressive release of holdback for a portion of the *Work* pursuant to any applicable *Payment Legislation*.

5.4.5 The *Owner* may refuse to pay some or all of the lien holdback amount provided that the *Owner* complies with any applicable requirements of the *Payment Legislation*.

5.4.6 **Annual Release of Holdback**

- .1 Accrued lien holdback the *Owner* is required to retain under the *Payment Legislation* shall be released on an annual basis in relation to *Work* performed during the applicable annual period provided that:
 - i. the *Construction Schedule* is longer than one year in duration;
 - ii. the *Contract Price* exceeds ten million dollars (\$10,000,000);
 - iii. the *Owner* has elected in the *Agreement Term Sheet* to release holdback on an annual basis;
 - iv. the *Contractor* submits to the *Owner* and *Consultant* an application for release of such holdback on an annual basis for the applicable annual period that includes a copy of the notice proposed to be given under subparagraph 5.4.6.1(v) and a statutory declaration using the latest CCDC 9A form of “Statutory Declaration of Progress Payment Distribution by Contractor”; and

- v. 60 calendar days after the date of the *Contractor's* application for release of the holdback on an annual basis and the giving of written notice in a form acceptable to the *Owner*, acting reasonably, by the *Contractor* to all *Contractor Personnel* of such application (including by posting of such notice in a visible location at the *Place of the Work*), there are no preserved or perfected liens in respect of the *Contract*, or all liens in respect of the *Contract* have been satisfied, discharged or otherwise provided for under the *Payment Legislation*.
- .2 For the purposes of this paragraph 5.4.6 the applicable annual period shall be each calendar year occurring during the term of the *Contract*.

5.4.7 **Phased Release of Holdback**

- .1 Accrued lien holdback the *Owner* is required to retain under the *Payment Legislation* shall be released on upon completion of each of phase of the *Work* expressly identified and described in the *Contract Documents* (each a "***Phase of the Work***") provided that:
 - i. the *Consultant* has certified that the subject *Phase of the Work* has been completed as required by the *Contract Documents*;
 - ii. the *Contract Price* exceeds ten million dollars (\$10,000,000);
 - iii. the *Owner* has elected in the *Agreement Term Sheet* to release holdback on a phased basis;
 - iv. the *Contractor* submits to the *Owner* and *Consultant* an application for release of such holdback on a phased basis for the completed *Phase of the Work* that includes a copy of the notice proposed to be given under subparagraph 5.4.7.1(v) and a statutory declaration using the latest CCDC 9A form of "Statutory Declaration of Progress Payment Distribution by Contractor"; and
 - v. 60 calendar days after the date of the *Contractor's* application for release of the holdback on a phased basis and the giving of written notice in a form acceptable to the *Owner*, acting reasonably, by the *Contractor* to all *Contractor Personnel* of such application (including by posting of such notice in a visible location at the *Place of the Work*), there are no preserved or perfected liens in respect of the *Contract*, or all liens in respect of the *Contract* have been satisfied, discharged or otherwise provided for under the *Payment Legislation*.

- 5.4.8 Subject to paragraph 5.4.5, when releasing holdback pursuant to paragraph 5.4.6 or paragraph 5.4.7 the *Owner* may retain out of such accrued lien holdback amount any sums required by law to satisfy any liens against the *Work* or, if permitted by the *Payment Legislation*, other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.
- 5.4.9 The *Owner's* payment of the accrued lien holdback on an annual basis or phased basis shall not limit, waive or diminish the *Contractor's* obligations, responsibilities, duties or liabilities under the *Contract* nor shall it constitute the *Owner's* acceptance of the *Work*. Further, no payment of holdback shall be made unless and until any liens have been satisfied, discharged or otherwise provided for under the *Payment Legislation*. Notwithstanding any such payment, the *Contractor* shall ensure that all *Work* and *Products* are protected pending *Completion* and be responsible for the correction of defects or *Work* not performed regardless of whether or not such was apparent when such payment was made. The *Contractor* shall indemnify and hold harmless the *Owner Entities* from all *Claims* resultant from the *Owner's* release of holdback pursuant to paragraphs 5.4.6 and 5.4.7 or *Contractor's* breach of its obligations under paragraphs 5.4.6 and 5.4.7.
- 5.4.10 For certainty, notwithstanding any provision of the *Agreement Term Sheet* or other *Contract Documents*, neither paragraph 5.4.6 nor paragraph 5.4.7 shall apply where the *Contract Price* as of the *Effective Date* does not meet or exceed the minimum contract price for release of holdback on an annual or phased basis established under the *Construction Act*.”

GC 5.5 FINAL PAYMENT

SC-53 Delete paragraphs 5.5.1 to 5.5.4 in their entirety and replace them with the following:

- “5.5.1 When the *Contractor* considers that *Completion* has been achieved, the *Contractor* shall submit a draft application for final payment within no more than five (5) *Working Days* of the claimed *Completion* date and shall submit a *Proper Invoice* to the *Owner* and *Consultant* for final payment no earlier than five (5) *Working Days* after submission of such draft application for final payment.
- 5.5.2 The *Consultant* will review the *Work* to certify or verify achievement of *Completion* and shall promptly, and in any event, no later than ten (10) calendar days after receipt of the *Contractor's Proper Invoice* for final payment:
- .1 advise the *Contractor* in writing that *Completion* has not been achieved and give reasons why, or
 - .2 state the date of *Completion* (as determined by the *Consultant*) in a certificate and issue a copy of that certificate to each of the *Owner* and the *Contractor*.

- 5.5.3 Payment of a *Proper Invoice* for final payment shall be made by the *Owner* in accordance with paragraph 5.3.1.2. All holdback amounts for finishing work prescribed by the *Payment Legislation* shall become due and payable to the *Contractor* following expiration of the holdback period stipulated in the *Payment Legislation* provided that all liens that may be claimed against such holdback have expired or been satisfied, discharged or otherwise provided for as required by the *Payment Legislation*.
- 5.5.4 For certainty, all references in the *Contract Documents* to final payment or a *Proper Invoice* for final payment shall refer to the *Proper Invoice* submitted by the *Contractor* and payment to be made by the *Owner* under the *Contract* following achievement of *Completion* or following the date of termination of the *Contract* or the *Contractor's* right to continue with the *Work* notwithstanding that payment of the *Warranty Security* (less any deductions to such security applied in accordance with this *Contract*) will not be made until satisfaction of all requirements set out in paragraph 12.3.8.”

GC 5.8 SET-OFF

SC-54 Add new GC 5.8 SET-OFF as follows:

“GC 5.8 SET-OFF

- 5.8.1 Notwithstanding any other provision in the *Contract* and subject to the provisions of the *Payment Legislation*, if the *Owner* has made an overpayment on any previous *Proper Invoice*, if the *Contractor* is in default under the *Contract* (including any failure to correct deficiencies as required by the *Contract*), if any amount is due and owing by the *Contractor* to the *Owner* under this *Contract*, or if the *Contractor* has not paid undisputed amounts due to *Contractor Personnel*, then without prejudice to any other right or remedy, the *Owner* may withhold or set-off payment from the *Contractor* of the amount reasonably necessary to protect the *Owner* from loss or damage arising from such event.”

GC 6.2 CHANGE ORDER

SC-55 Add new paragraph 6.2.1A as follows:

“6.2.1A If the *Contractor* is of the opinion that any direction or instruction received from the *Consultant* or the *Owner*, including any *Supplemental Instruction*, constitutes a proposed change in the *Work*, it shall give the *Consultant* and *Owner Notice in Writing* of such change within 5 *Working Days*, which notice shall include a written description of the alleged change in the *Work*, including a description of the anticipated impact to the *Contract Price* and *Contract Time* and all available supporting documentation. The *Consultant* will promptly investigate such alleged change in the *Work* and make a finding. If the finding is that such direction or instruction does constitute a change for which adjustment of the *Contract Price* and *Contract Time* is justified under the *Contract*, then, if the *Owner* does not dispute such finding within the time stipulated in Part 8 – DISPUTE RESOLUTION, the *Consultant* will issue appropriate instructions for a change in the *Work* as provided in paragraph 6.2.1. If the finding is that the direction or instruction does not constitute a change for which adjustment of the *Contract Price* or *Contract Time* is justified under the *Contract*, the *Consultant* shall provide its reasons for such finding in writing to the *Owner* and *Contractor* and the *Contractor* shall proceed with the affected *Work*, including implementation of the subject direction or instruction, and may dispute the finding of the *Consultant* under this paragraph 6.2.1A in accordance with PART 8 – DISPUTE RESOLUTION. For certainty, the *Contractor* shall not delay in its implementation of the subject direction or instruction or performance of any affected *Work* while the *Consultant* investigates the alleged change and makes a finding pursuant to this paragraph 6.2.1A.”

SC-56 Add new paragraphs 6.2.3 to 6.2.6 as follows:

“6.2.3 The *Contractor* shall prepare and submit to the *Consultant* and the *Owner* all details and supporting documentation regarding impacts of a proposed change to the *Contract Price* and *Contract Time* within ten (10) *Working Days* after notice of the proposed change is given to the *Contractor* under paragraph 6.2.1 and otherwise within five (5) *Working Days* of such details and supporting documentation becoming known or available, as applicable.

6.2.4 Unless otherwise agreed by the parties, the adjustment in the *Contract Price* for any change shall be determined in accordance with paragraphs 6.3.6 and 6.3.7.

- 6.2.5 For valuation of changes to the *Work*, including in respect of any contemplated *Change Order* or request for a *Change Order* by the *Contractor*, the *Contractor* shall provide the *Owner* and *Consultant* with a detailed breakdown of all expenditures itemized in paragraph 6.3.7 anticipated to be incurred in respect of the change and such other documentation as reasonably required by the *Owner* and *Consultant* to determine the anticipated expenditures to be incurred by the *Contractor* attributable to the change. The foregoing detailed breakdown shall include a breakdown of the price quotation that includes the following to the extent applicable, with appropriate supporting documentation: (i) estimated labour costs, including hours and applicable hourly rates; (ii) estimated *Product* costs, including *Supplier* quotations, estimated quantities and unit prices; (iii) estimated *Construction Equipment* costs; (iv) enumeration of all other estimated costs included in the price quotation; (v) estimated credit amounts for labour and *Products* not required on account of the proposed change; (vi) *Subcontractor* quotations, including a detailed breakdown of all of the foregoing and (vii) estimated *Contractor's* percentage fee for profit and *Overhead* as per paragraph 6.3.6. For certainty, for all changes the *Contractor's* percentage fee shall be as stipulated in paragraph 6.3.6.
- 6.2.6 A *Change Order* shall be a final determination and adjustment to the *Contract Time*, and *Contract Price* in respect of the subject change and there shall be no further adjustments to the *Contract Time* or *Contract Price* or compensation or payment of any kind whatsoever based on the aggregate number, scope or value of changes in the *Work* whether resulting from *Change Orders* or *Change Directives*.

GC 6.3 CHANGE DIRECTIVE

SC-57 Delete subparagraph 6.3.6.3 in its entirety and replace it with the following:

- “.3 Subject to subparagraph 6.3.6.4, in respect of the *Contractor*'s percentage fee, the *Contractor* shall be entitled to apply mark-ups as follows to the actual costs of performing the work attributable to the change as determined in accordance with paragraph 6.3.7 (exclusive of *Value Added Taxes*), which mark-ups include the *Contractor*'s fee for profit and *Overhead* (including profit and *Overhead* of all *Contractor Personnel*):
- i. for *Contractor*'s own work: a mark-up in an amount of no more than 15% of the *Net Actual Cost* of the *Contractor*'s own work
 - ii. for *Subcontractor*'s own work: a mark-up in an amount of no more than 15% of the *Net Actual Cost* of the *Subcontractor*'s own work; and
 - iii. *Contractor*'s mark-up on *Subcontractor*'s own work: a mark-up in an amount of not more than 10% of the *Net Actual Cost* of the *Subcontractor*'s own work.

For certainty, no further mark-up shall be applied to any costs attributable to the change, including in respect of profit and *Overhead* for *Contractor Personnel*, and regardless of the extent to which the subject work is assigned or sublet to others. If *Work* is assigned or sublet to an associate, as defined by the *Securities Act*, RSO 1990, c. S.5, as amended, no mark-up whatsoever shall be applied.”

SC-58 Add new subparagraphs 6.3.6.4 and 6.3.6.5 as follows:

- “.4 In no event shall the maximum aggregate mark-up applied by all levels of contract for overhead and profit pursuant to subparagraph 6.3.6.3 exceed 30% of the total *Net Actual Cost* of approved change.
- .5 Where the *Owner* and *Contractor* agree in writing to a rate and pricing schedule, to the extent applicable such rate and pricing schedule will be used to determine the cost of the *Contractor*'s actual expenditures and savings under paragraph 6.3.7.”

SC-59 Delete subparagraph 6.3.7.1(2) in its entirety.

SC-60 In subparagraph 6.3.7.6 add the following to the end:

“For certainty, in determining the cost of performing the work attributable to the change no mark-up shall be applied to the actual expenditures incurred by a *Subcontractor* attributable to the change, which expenditures shall be itemized as required pursuant to paragraph 6.3.15. All profit and *Overhead* of the *Subcontractor* is included in the *Contractor*’s percentage fee to be applied pursuant to subparagraph 6.3.6.3.”

SC-61 Delete paragraph 6.3.11 in its entirety and replace it with the following:

“Subject to paragraph 6.3.14, any undisputed value of *Work* performed as the result of a *Change Directive* shall be confirmed by way of one or more *Change Orders* and upon issuance of any such *Change Order* these amounts may be included in progress payments.”

SC-62 Add new paragraphs 6.3.14 and 6.3.15 as follows:

“6.3.14 Where a *Change Directive* stipulates a maximum amount that may be incurred in respect of such *Change Directive*, the *Contractor* shall give the *Owner* written notice at least 2 *Working Days* prior to incurring any costs in excess of such stipulated maximum and may not include in any *Proper Invoice* any amount in excess of such stipulated maximum without the prior written approval of the *Owner* in the form of a further or amended *Change Directive*. For certainty, stipulation of a maximum amount that may be incurred in respect of a *Change Directive* does not constitute the *Owner*’s agreement to the quantum of costs that may be attributable to the *Change Directive* and shall not obligate the *Owner* to issue a *Change Order* in respect of any claimed amount for the value of the *Work* performed as the result of the *Change Directive* that remains under dispute.

6.3.15 Without limiting the *Contractor*’s obligations under this GC 6.3, for valuation of any *Change Directive* the *Contractor* shall provide the *Owner* and *Consultant* with detailed itemized breakdowns of all actual expenditures itemized in 6.3.7 and incurred in respect of the change, including detailed, substantiated time sheets, purchase orders, receipts or cost vouchers from *Subcontractors* and *Suppliers* and such other documentation as reasonably required by the *Owner* and *Consultant* to determine the actual expenditures incurred by the *Contractor* attributable to the change.”

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

SC-63 Amend subparagraphs 6.4.1.1 and 6.4.1.2 by adding the following after the words “*Contract Documents*” in each subparagraph:

“and which would not have been readily apparent prior to the *Contractor’s* commencement of the performance of the *Work* from review of the *Contract Documents* and *Place of the Work* by the *Contractor* as required by the *Contract Documents*, including pursuant to paragraph 1.5 of Article A-5 and paragraph 1.1.3 of GC 1.1”

GC 6.5 DELAYS

SC-64 Add the following to the end of paragraph 6.5.2:

“Notwithstanding the foregoing, (i) where the stop work order was issued as a result of or due to a *Force Majeure Event* this paragraph 6.5.2 shall not apply and the *Contractor’s* entitlement to adjustment of the *Contract Time* or *Contract Price* shall be governed by paragraph 6.5.3, and (ii) where the stop work order was issued as a result of or due to *COVID-19*, the *Pandemic* or a *Pandemic Change in Law*, including a *Governmental Response*, and was not the result of an act or fault of any *Contractor Personnel*, directly or indirectly, this paragraph 6.5.2 shall not apply and the *Contractor’s* entitlement to adjustment of the *Contract Time* or *Contract Price* shall be governed by the provisions of Article A-10 hereof.”

SC-65 Delete paragraph 6.5.3 in its entirety and replace it with the following:

“6.5.3 If the *Contractor* is delayed in the performance of the *Work* by a *Force Majeure Event*, including:

- .1 labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractors’ association, of which the *Contractor* is a member or to which the *Contractor* is otherwise bound),
- .2 fire, unusual delay by common carriers or unavoidable casualties, or

.3 *Abnormally Adverse Weather Conditions,*

then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the *Contractor* agrees to a shorter extension. Except to the extent such delays result from actions by *Owner Personnel*, the *Contractor* shall only be entitled to payment for costs directly incurred with the *Owner's* written approval to protect the *Work* and secure the *Place of the Work* during the period of such delay and to mitigate the impacts of such delay to performance of the *Work* within the *Contract Time*. For certainty, in the event of delay caused by or resultant from *COVID-19*, the *Pandemic* or a *Pandemic Change in Law*, including a *Governmental Response*, this paragraph 6.5.3 shall not apply and the *Contractor's* entitlement to adjustment of the *Contract Time* or *Contract Price* shall be governed by the provisions of Article A-10 hereof.”

SC-66 Delete paragraph 6.5.4 in its entirety and replace it with the following:

“6.5.4 Upon the occurrence of any event that may cause delay to performance of the *Work* the *Contractor* shall promptly give the *Owner* verbal notice of such delay event. No extension shall be made for delay unless *Notice in Writing* of the cause of delay is given to the *Consultant* and *Owner* not later than 10 *Working Days* after the commencement of the delay. In the case of a continuing cause of delay only one *Notice in Writing* shall be necessary.”

SC-67 Delete paragraph 6.5.5 in its entirety and replace it with the following:

“6.5.5 No adjustment to the *Contract Time* shall be made because of failure of the *Consultant* to furnish instructions unless the *Consultant* has failed to furnish such instructions within the time stipulated in any schedule agreed-to by the parties for submission and return of *Shop Drawings* and *Submittals* and the *Contractor* has given at least two (2) *Working Days' Notice in Writing* to the *Consultant* and *Owner* of the date for upon which such instructions are required.”

SC-68 Add new paragraphs 6.5.6 and 6.5.7 as follows:

“6.5.6 Any adjustment to the *Contract Time* under this *Contract* shall be determined based on the direct impacts of the subject change or delay to the critical path for performance of the *Work* as of the date of the change or delay.

6.5.7 The *Contractor* acknowledges that the *Owner* will suffer real and significant losses if the *Contractor* fails to attain *Ready-for-Takeover* by the *Ready-for-Takeover Date*.

.1 Where the *Owner* has stipulated an amount for liquidated damages in the *Agreement Term Sheet*, then if the *Contractor* fails to achieve *Ready-for-Takeover* by the *Ready-for-Takeover Date* then the *Contractor* shall be liable to the *Owner* for liquidated damages in accordance with paragraph 4.7 of Article A-4 for each day or part day of delay until *Ready-for-Takeover* is achieved as confirmed by the *Consultant* in accordance with GC 12.1. The parties agree that such liquidated damages are not a penalty and represent a reasonable, fair and genuine pre-estimate of losses to the *Owner* anticipated to result from the *Contractor*'s delay in achieving *Ready-for-Takeover* by the *Ready-for-Takeover Date*.

.2 Where the *Owner* has not stipulated an amount for liquidated damages in the *Agreement Term Sheet*, then subparagraph 6.5.7.1 shall not apply and the *Contractor* shall be liable for and shall indemnify and hold harmless the *Owner* from all *Claims* resultant from or caused by failure to achieve *Ready-for-Takeover* by the *Ready-for-Takeover Date* and/or *Completion* by the *Completion Date*, including costs incurred for the *Consultant*, any *Claims* arising under any lease agreements for the *Project* (if applicable), and any *Claims* relating to financing of the *Project*.”

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

SC-69 Delete paragraph 6.6.1 in its entirety and replace it with the following:

“6.6.1 If the *Contractor* intends to make a claim for an increase to the *Contract Price* the *Contractor* shall give *Notice in Writing* of intent to claim to the *Owner* and to the *Consultant* within five (5) *Working Days* of commencement of the event or series of events giving rise to such claim. Notwithstanding the foregoing, any claim for adjustment to the *Contract Price* resultant from *COVID-19*, the *Pandemic* or a *Pandemic Change in Law*, including a *Governmental Response*, shall be governed by the provisions of Article A-10 and this GC 6.6 shall not apply.”

SC-70 Delete paragraphs 6.6.3 and 6.6.4 in their entirety and replace them with the following:

“6.6.3 The party making a claim pursuant to this GC 6.6 shall prepare and submit to the *Consultant* and other party in writing all available details and supporting documentation regarding the claim not later than ten (10) *Working Days* after commencement of the event or series of events giving rise to such claim and shall thereafter submit all such details and supporting documentation within five (5) *Working Days* of such details and supporting documentation becoming known or available, as applicable. For certainty, the supporting documentation to be submitted shall include all evidence reasonably required by the *Consultant* to make a finding and all such supporting documentation shall be prepared at the applicable party’s own cost.

6.6.4 Without limiting paragraph 6.6.3, where the event or series of events giving rise to the claim has a continuing effect, the detailed account submitted under paragraph 6.6.3 shall be considered to be an interim account and the party making the claim shall, weekly or bi-weekly as the *Consultant* may reasonably require, submit further written interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account within five (5) *Working Days* of the end of the effects resulting from the event or series of events.”

SC-71 Add new paragraph 6.6.7 as follows:

“6.6.7 Where the party making a claim fails to provide notice or details and supporting documentation within the time stipulated in this GC 6.6 and such failure prevents the *Consultant* or other party from mitigating or minimizing *Claims* resultant from the event or series of events giving rise to such claim or otherwise causes the other party loss or damage, then the party making the claim shall be barred from bringing the subject claim.”

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

SC-72 Delete subparagraph 7.1.5.1 in its entirety and replace it with the following:

“.1 take possession of the *Work* and *Products* at the *Place of the Work*; subject to the rights of third parties, utilize the *Construction Equipment* and *Temporary Work* at the *Place of the Work*; require the *Contractor* to transfer, novate or assign all agreements with *Subcontractors* and *Suppliers* in respect of the *Work* to the *Owner* or other contractors designated by the *Owner*; finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense,”

SC-73 In subparagraph 7.1.5.4 delete the words “warranty period” and replace them with the words “*Warranty Period*”.

SC-74 Add a new subparagraph 7.1.5.5 as follows:

“.5 set-off against any amount payable to the *Contractor* under the *Contract* all amounts payable by the *Contractor* to the *Owner*.”

SC-75 Add a new paragraphs 7.1.7 and 7.1.8 as follows:

“7.1.7 The *Owner* shall not be liable to the *Contractor* for any *Consequential Damages* arising from termination pursuant to this GC 7.1.

7.1.8 The *Contractor* shall submit to the *Owner* and *Consultant* a *Proper Invoice* for final payment no later than 45 calendar days after the date of termination.”

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

SC-76 Delete paragraph 7.2.2 in its entirety.

SC-77 Delete subparagraphs 7.2.3.1 and 7.2.3.2 in their entirety.

SC-78 In subparagraph 7.2.3.4 delete the words “except for GC 5.1 FINANCIAL INFORMATION REQUIRED OF THE OWNER.”

SC-79 In paragraph 7.2.4, delete “5 *Working Days*” from the second line and replace with “fifteen (15) *Working Days*”, and add the following to the end of the paragraph:

“The *Owner* shall be deemed not to be in default of its obligations under the *Contract* if it is taking active steps to remedy the default but cannot reasonably do so within the said fifteen (15) *Working Day* period.”

SC-80 In paragraph 7.2.5, delete the words “including reasonable profit” and replace them with the words “to the date of termination” and add the words “, but shall not be entitled to compensation for any *Consequential Damages*” after the words “termination of the *Contract*”.

SC-81 Add new paragraph 7.2.6 as follows:

“7.2.6 The *Contractor*’s claim for compensation under this GC 7.2 shall be submitted to the *Owner* and *Consultant* in the form of a *Proper Invoice* for final payment no later than 45 calendar days after the date of termination.”

GC 7.3 TERMINATION FOR CONVENIENCE

SC-82 Add new GC 7.3 TERMINATION FOR CONVENIENCE as follows:

“GC 7.3 TERMINATION FOR CONVENIENCE

- 7.3.1 The *Owner* may in its sole discretion terminate the *Contractor*’s right to continue with the *Work* in whole or in part or this *Contract* for any reason, including without cause or for convenience, at any time by giving at least 30 calendar days’ *Notice in Writing* of such termination to the *Contractor* specifying the date of termination.
- 7.3.2 In the event of termination pursuant to paragraph 7.3.1, the *Contractor* shall be entitled to be paid for all work performed to the date of termination, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a direct result of such termination, but shall not be entitled to compensation for any *Consequential Damages*. The *Contractor*’s claim for such compensation shall be submitted to the *Owner* and *Consultant* in the form of a *Proper Invoice* for final payment no later than 45 calendar days after the date of termination.”

GC 8.1 AUTHORITY OF THE CONSULTANT

SC-83 In paragraph 8.1.2 delete the words “paragraph 8.1.3 and paragraphs 8.3.3 to 8.3.8 of”.

SC-84 In paragraph 8.1.3, add the following after the first sentence:

“The *Contractor* shall continue performance of the *Work* notwithstanding any such dispute and shall ensure all other *Contractor Personnel* also do so.”

GC 8.2 ADJUDICATION

SC-85 Delete paragraph 8.2.1 in its entirety and replace it with the following:

“8.2.1 Nothing in this *Contract* shall be deemed to affect the rights of the parties to resolve any dispute by adjudication as may be provided for by applicable legislation. Further, in addition to the matters that may be referred to adjudication pursuant to the *Payment Legislation*, the parties agree that any dispute relating to costs resultant from termination of the *Contract* or of the *Contractor*’s right to continue with the *Work* or payments due and owing in the event of or following any such termination may be referred by either party to adjudication. For certainty, no dispute regarding the validity of any such termination may be referred to adjudication and any such dispute shall be resolved in accordance with GC 8.3.”

SC-86 Add new paragraph 8.2.2 as follows:

“8.2.2 To the extent permitted by the *Construction Act* and except as required for performance of the parties’ obligations under this *Contract* or exercise of their rights under the *Construction Act*, any adjudication in respect of the *Contract* and *Project*, including all documentation and materials exchanged and any resultant award or order issued by an adjudicator, shall be confidential as between the parties.”

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

SC-87 Delete paragraph 8.3.1 in its entirety.

SC-88 Delete paragraph 8.3.2 in its entirety and replace it with the following:

“8.3.2 For any finding of the *Consultant* under GC 2.2 – ROLE OF THE CONSULTANT that is clearly identified as a finding for the purposes of this paragraph 8.3.2 of the *Contract*, a party shall be conclusively deemed to have accepted such finding and to have expressly waived and released the other party from any claims in respect of the particular matter dealt with in that finding unless, within 15 *Working Days* after receipt of that finding, the party sends a *Notice in Writing* of dispute to the other party and to the *Consultant*, which contains the particulars of the matter in dispute and the relevant provisions of the *Contract Documents*.”

SC-89 Delete paragraphs 8.3.4, 8.3.5 and 8.3.6 in their entirety and replace them with the following:

“8.3.4 Following receipt of a responding party’s *Notice in Writing* of reply under paragraph 8.3.2, the parties may elect to engage in mediated negotiations to assist the parties in reaching agreement on any unresolved dispute.

8.3.5 If the dispute is not resolved at a mediation or if the parties do not agree to mediate the dispute, either party may terminate the mediation by giving *Notice in Writing* to other party and the *Consultant*.

8.3.6 Upon termination of the mediation pursuant to paragraph 8.3.5 the dispute shall be finally resolved by arbitration which may be commenced by either party by *Notice in Writing* to the other party. The arbitration shall be conducted in the jurisdiction of the *Place of the Work* and the parties agree that the arbitral award shall be final and binding and may only be appealed to the court on a question of law subject to the leave of such court as may be granted in accordance with subsection 45(1) of the *Arbitration Act*. For certainty, there shall be no appeal of the arbitral award on a question of fact or mixed fact and law.”

SC-90 Delete paragraph 8.3.7 in its entirety.

SC-91 In paragraph 8.3.8 delete the words “*Notice in Writing* requesting arbitration in paragraph 8.3.6” and replace them with the words “termination of the mediation pursuant to paragraph 8.3.5”.

SC-92 Add the following new paragraphs 8.3.9 to 8.3.13:

“8.3.9 Within five *Working Days* of the termination of the mediation pursuant to paragraph 8.3.5, the *Owner* and the *Contractor* shall give the *Consultant* a written notice containing:

- .1 a copy of supplementary conditions 8.3.9 to 8.3.14 of this *Contract*, and;
- .2 a description of any claims or issues which the *Contractor* or the *Owner*, as the case may be, wishes to raise in relation to the *Consultant* arising out of the issues in dispute in the arbitration.

8.3.10 The *Owner* and the *Contractor* agree that the *Consultant* may elect to become a full party to the arbitration under paragraph 8.3.6 if the *Consultant*:

- .1 has a vested or contingent financial interest in the outcome of the arbitration;
- .2 gives the notice of election to the *Owner* and the *Contractor* within ten (10) *Working Days* of receipt of the notice under paragraph 8.3.9;
- .3 agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.3.6, and,
- .4 agrees to be bound by the arbitral award made in the arbitration.

8.3.11 Without limiting and subject to the *Owner* and *Contractor*’s rights under paragraph 8.3.12 to challenge whether the *Consultant* has satisfied the requirements of paragraph 8.3.10, if an election is made under paragraph 8.3.10:

- .1 the *Owner* or *Contractor* may request particulars and evidence of the *Consultant*’s vested or contingent financial interest in the outcome of the arbitration;
- .2 the *Consultant* shall participate in the appointment of the arbitrator; and,
- .3 notwithstanding the rules referred to in paragraph 8.3.6, the time period for reaching agreement on the appointment of the arbitrator shall begin to run from the date the respondent receives a copy of the notice of arbitration.

8.3.12 The arbitrator in the arbitration in which the *Consultant* has elected under paragraph 8.3.10 to become a full party may:

- .1 on application of the *Owner* or the *Contractor*, determine whether the *Consultant* has satisfied the requirements of paragraph 8.3.10, and;
- .2 make any procedural order considered necessary to facilitate the addition of the *Consultant* as a party to the arbitration.

8.3.13 The provisions of paragraph 8.3.9 shall apply (with all appropriate changes being made) to written notice to be given by the *Consultant* to any sub-consultant.”

GC 9.1 PROTECTION OF WORK AND PROPERTY

SC-93 Amend subparagraph 9.1.1.1 by adding the following to the end:

“which the *Contractor* could not have discovered from review as required by the *Contract Documents*, including paragraph 1.1.3 of GC 1.1”

SC-94 Delete paragraph 9.1.1.2 in its entirety and replace it with the following:

“.2 negligent acts or omissions of any *Owner Personnel*.”

SC-95 Delete paragraph 9.1.2 in its entirety and replace it with the following:

“9.1.2 Before commencing any *Work*, the *Contractor* shall determine the locations of all underground utilities and structures indicated in the *Contract Documents*, or that are reasonably discoverable from inspection of the *Place of the Work* as required by the *Contract Documents*, including paragraph 1.5 of Article A-1.”

SC-96 Add new paragraphs 9.1.5 and 9.1.6 as follows:

“9.1.5 The *Contractor* shall cooperate in all respects, at no cost to the *Owner*, to provide accommodation and safe access to the *Place of the Work* or portions thereof as the *Owner Personnel* may require from time to time and as may be required by utility providers with equipment or operations located at the *Place of the Work*.

9.1.6 No *Owner Personnel* or *Owner Entities* shall have any liability for the safeguarding or protection of, or for the loss, theft, damage, destruction, or disappearance of, any *Construction Equipment, Products, Temporary Work* or other tangible property or materials located at the *Place of the Work*, except to the extent caused by their own negligence.”

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

SC-97 In paragraph 9.2.3 delete the first word “The” and replace it with the following:

“Without limiting any of the *Contractor’s* obligations under this *Contract*, including for overall health and safety at the *Place of the Work*, the”

SC-98 Add the following words to paragraph 9.2.6 after the word “responsible”:

“or whether any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with *Applicable Laws*) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment or material damage to the property of the *Owner* or others,”

SC-99 Add the words “and the *Consultant*” after the word “*Contractor*” in subparagraph 9.2.7.4.

SC-100 Add the following words to paragraph 9.2.8 after the word “responsible”:

“or that any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with *Applicable Laws*) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment or material damage to the property of the *Owner* or others,”

GC 9.4 CONSTRUCTION SAFETY

SC-101 Delete paragraph 9.4.1 in its entirety and replace it with the following:

“9.4.1 The *Contractor* shall be solely responsible for: (i) construction health and safety at the *Place of the Work*, including all responsibilities of the “constructor” under the *OHSA*; (ii) compliance with the rules, regulations, and practices required by *Applicable Laws*, including the *OHSA*; and (iii) initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the *Work*. The *Contractor* shall file the requisite “notice of project” and list itself as the “constructor” with respect to the *Project*.”

SC-102 Delete paragraph 9.4.4 in its entirety and replace it with the following:

“9.4.4 The *Owner* shall cause the *Owner Personnel* to comply with all health and safety precautions and programs established by the *Contractor* at the *Place of the Work*, including by requiring such compliance in any contracts with *Owner Personnel*.”

SC-103 Add the following new paragraphs 9.4.6 to 9.4.11:

- “9.4.6 The *Contractor* shall provide appropriate health and safety instruction and training to all *Contractor Personnel* (to the extent same have access to the *Place of the Work*) before the *Work* is commenced.
- 9.4.7 The *Contractor* and each *Subcontractor* having an accident or incident at the *Place of the Work*, as prescribed under the *OHSA*, shall promptly notify the *Owner* and the *Consultant*.
- 9.4.8 Prior to commencement of the *Work*, and again at any time upon request by the *Owner*, the *Contractor* shall provide the *Owner* with information and evidence regarding compliance with its obligations relating to health and safety under this *Contract* (including compliance with paragraph 3.1.6, GC 9.4 and paragraph 10.2.4), which evidence shall include: (i) a copy of the *Contractor*’s “notice of project” identifying the *Contractor* as the “constructor” with respect to the *Project* under the *OHSA*; (ii) a copy of all “Form 1000s” obtained by the *Contractor* from *Contractor Personnel* as required by the *OHSA*; (iii) a copy of all health and safety plans and programs prepared by the *Contractor* in respect of the *Place of the Work* and/or performance of the *Work*; (iv) a copy of the *Contractor*’s subcontracts with *Contractor Personnel*; (v) copies of training logs and meeting minutes relating to health and safety at the *Place of the Work* and/or in performance of the *Work*; (vi) copies of any and all documentation filed by or submitted to any *Governmental Authority* by any *Contractor Personnel* in respect of the *Project*, the *Work* or the *Place of the Work*, including any accident or incident reports; and (vii) any other documentation relating to the *Contractor*’s health and safety obligations under this *Contract* as may be reasonably requested by the *Owner*.
- 9.4.9 The *Contractor* represents that it has the experience, knowledge and expertise in respect of construction health and safety necessary for performance of the *Work* and all obligations under this *Contract* in accordance with all *Applicable Laws*, including as necessary to undertake all obligations of the “constructor” under the *OHSA* and to provide for compliance with all requirements of the *OHSA* applicable to the *Place of the Work* and performance of the *Work*. The *Contractor* further acknowledges that the *Owner Entities* do not have such knowledge, experience and expertise and are accordingly relying upon the *Contractor* in this respect.
- 9.4.10 The *Contractor* shall indemnify and save harmless all *Owner Personnel* and *Owner Entities* from and against any and all *Claims* arising out of any safety infractions committed by any *Contractor Personnel* or resulting from any failure by the *Contractor* to fulfill its obligations under paragraph 3.1.6, paragraph 10.2.4 and/or this PART 9 – PROTECTION OF PERSONS AND PROPERTY.

9.4.11 The provisions of this GC 9.4 shall survive the completion of the *Work* or the termination of the *Contract* for any reason whatsoever.”

GC 9.5 MOULD

SC-104 Add the words “and the *Consultant*” after the word “*Contractor*” in subparagraph 9.5.3.4.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

SC-105 Replace all reference to “laws” and “applicable laws” in GC 10.2 with “*Applicable Laws*”.

SC-106 Delete paragraph 10.2.5 in its entirety and replace it with the following:

“10.2.5 Subject to compliance with its obligations under paragraph 1.5 of Article A-5 and paragraph 1.1.3 of GC 1.1, the *Contractor* shall not be responsible for verifying that the *Contract Documents* are in compliance with *Applicable Laws*. If the *Contract Documents* are at variance therewith, or if, subsequent to the *Effective Date*, changes are made to *Applicable Laws* which require modification to the *Contract Documents*, the *Contractor* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will issue the changes required to the *Contract Documents* as provided in GC 6.1 – OWNER’S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.”

SC-107 Delete paragraph 10.2.7 in its entirety and replace it with the following:

“10.2.7 If, subsequent to the *Effective Date*, changes are made to *Applicable Laws* which affect the cost of the *Work*, either party may submit a claim in accordance with the requirements of GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE. Notwithstanding the foregoing, any claim for adjustment to the *Contract Price* resultant from *COVID-19*, the *Pandemic* or a *Pandemic Change in Law*, including a *Governmental Response*, shall be governed by the provisions of Article A-10 and this paragraph 10.2.7 and GC 6.6 shall not apply.”

GC 10.4 WORKERS’ COMPENSATION

SC-108 In paragraph 10.4.1, replace the word “applications for payment” with the words “*Proper Invoices*”.

SC-109 Add new paragraphs 10.4.2 and 10.4.3 as follows:

“10.4.2 At any time during the term of the *Contract*, when requested by the *Owner*, the *Contractor* shall provide such evidence of compliance by the *Contractor* and *Subcontractors*.

10.4.3 The *Contractor* shall indemnify and hold harmless the *Owner* and its directors, officers and employees from and against all *Claims* by any *Contractor Personnel* with respect to workers' compensation insurance claims. This indemnity shall survive the completion of the *Work* or the termination of the *Contract* for any reason whatsoever."

GC 11.1 INSURANCE

SC-110 Revise paragraph 11.1.1 as follows:

- (1) **Where the original *Contract Price* stipulated in the Agreement is equal to or less than \$5,000,000:** Delete paragraph 11.1.1 and replace it with the following:

"11.1.1 Without restricting the generality of GC 13.1 – INDEMNIFICATION, the *Contractor* shall provide, maintain and pay for the following insurance coverages, the requirements of which are specified in Appendix 3 to the Supplementary Conditions – Insurance in effect at the time of bid closing except as hereinafter provided:

- .1 Commercial General liability insurance in the name of the *Contractor* and include, or in the case of a single, blanket policy, be endorsed to name, the *Owner* and the *Consultant* as additional insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the *Contractor* with regard to the *Work*. Commercial General liability insurance shall be maintained from the date of commencement of the *Work* until one year from the date of *Ready-for-Takeover*. Liability coverage shall be provided for completed operations hazards from the date of *Ready-for-Takeover*, as set out in the certificate of *Ready-for-Takeover*, on an ongoing basis for a period of 6 years following *Ready-for-Takeover*.
- .2 Automobile Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
- .3 Unmanned aerial vehicle aircraft, manned aircraft or watercraft Liability Insurance when owned or non-owned manned or unmanned aircraft or watercraft are used directly or indirectly in the performance of the *Work*.

- .4 “Broad form Builders Risk” property insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The “Broad form” property insurance shall be provided from the date of commencement of the *Work* until the earliest of:
- (1) 10 calendar days after the date of *Ready-for-Takeover*;
 - (2) on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the *Work*; and
 - (3) when left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.
- .5 Boiler and machinery insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. Such coverage can be included as part of the Broad Form Builders Risk policy. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of *Ready-for-Takeover*.

- .6 The “Broad form Builders Risk” property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. In the event of loss or damage:
- (1) the *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or damage shall not affect the rights and obligations of either party under the *Contract* except that the *Contractor* shall be entitled to such reasonable extension of *Contract Time* relative to the extent of the loss or damage as the *Consultant* may recommend in consultation with the *Contractor*;
 - (2) the *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount which the *Owner*’s interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds in accordance with the progress payment provisions. In addition the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor*’s interest in the restoration of the *Work*; and
 - (3) to the *Work* arising from the work of the *Owner*, the *Owner*’s own forces or *Other Contractors*, the *Owner* shall, in accordance with the *Owner*’s obligations under the provisions relating to construction by the *Owner* or *Other Contractors*, pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as in accordance with the progress payment provisions.
- .7 Contractors’ Equipment Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
- .8 Contractors’ Pollution Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.”

- (2) **Where the original *Contract Price* stipulated in the Agreement is greater than \$5,000,000 and equal to or less than \$25,000,000:** Delete paragraph 11.1.1 and replace it with the following:

“11.1.1 Without restricting the generality of GC 13.1 – INDEMNIFICATION, the *Contractor* shall provide, maintain and pay for the following insurance coverages, the requirements of which are specified in Appendix 3 to the Supplementary Conditions – Insurance in effect at the time of bid closing except as hereinafter provided:

- .1 Wrap-up liability insurance in the name of the *Contractor* and including all *Owners, Contractors, Subcontractors* and the *Consultants engaged in the work* as insureds. Wrap-up liability insurance shall be maintained from the date of commencement of the *Work* until one year from the date of *Ready-for-Takeover*. Liability coverage shall be provided for completed operations hazards from the date of *Ready-for-Takeover*, as set out in the certificate of *Ready-for-Takeover*, on an ongoing basis for a period of 6 years following *Ready-for-Takeover*.
- .2 Automobile Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
- .3 Unmanned aerial vehicle aircraft, manned aircraft or watercraft Liability Insurance when owned or non-owned manned or unmanned aircraft or watercraft are used directly or indirectly in the performance of the *Work*.
- .4 “Broad form Builders Risk” property insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The “Broad form” property insurance shall be provided from the date of commencement of the *Work* until the earliest of:
 - (1) 10 calendar days after the date of *Ready-for-Takeover*;

- (2) on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the *Work*; and
 - (3) when left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.
- .5 Boiler and machinery insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. Such coverage can be included as part of the Broad Form Builders Risk policy. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of *Ready-for-Takeover*.
- .6 The “Broad form Builders Risk” property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. In the event of loss or damage:
 - (1) the *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or damage shall not affect the rights and obligations of either party under the *Contract* except that the *Contractor* shall be entitled to such reasonable extension of *Contract Time* relative to the extent of the loss or damage as the *Consultant* may recommend in consultation with the *Contractor*;

- (2) the *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount which the *Owner's* interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds in accordance with the progress payment provisions. In addition the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor's* interest in the restoration of the *Work*; and
- (3) to the *Work* arising from the work of the *Owner*, the *Owner's* own forces or *Other Contractors*, the *Owner* shall, in accordance with the *Owner's* obligations under the provisions relating to construction by the *Owner* or *Other Contractors*, pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as in accordance with the progress payment provisions.

- .7 Contractors' Equipment Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
- .8 Project Specific Contractors' Pollution Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
- .9 Commercial General liability insurance in the name of the *Contractor* and include, or in the case of a single, blanket policy, be endorsed to name, the *Owner* and the *Consultant* as additional insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the *Contractor* with regard to the *Work*. Commercial General liability insurance shall be maintained from the date of commencement of the *Work* until one year from the date of *Ready-for-Takeover*. Liability coverage shall be provided for completed operations hazards from the date of *Ready-for-Takeover*, as set out in the certificate of *Ready-for-Takeover*, on an ongoing basis for a period of 6 years following *Ready-for-Takeover*."

- (3) **Where the original *Contract Price* stipulated in the Agreement is greater than \$25,000,000:** Delete paragraph 11.1.1 and replace it with the following:

“11.1.1 The *Contractor* shall provide, maintain and pay for insurance coverages as stipulated by the *Owner* in writing prior to commencement of the *Work*. Where no written direction in respect of insurance coverages is provided by the *Owner* prior to commencement of the *Work* then the insurance requirements for projects with an original *Contract Price* greater than \$5,000,000 and equal to or less than \$25,000,000 shall apply notwithstanding that the *Contact Price* is greater than \$25,000,000.”

SC-111 In all instances and for all *Contract Prices*, delete paragraphs 11.1.6, 11.1.7 and 11.1.8 in their entirety.

GC 11.2 CONTRACT SECURITY

SC-112 Add new GC 11.2 CONTRACT SECURITY as follows:

“GC 11.2 CONTRACT SECURITY

11.2.1 *Contractor* shall provide security and bonding if and as stipulated in the *Contract Documents*. Without limiting the foregoing, where the *Contract Price* as of the *Effective Date* is \$500,000 or more, bonds will be provided by the *Contractor* as required by the *Construction Act*, the coverage limit of which shall include *Value Added Taxes* as stipulated in paragraph 4.2 of Article A-4.”

GC 12.1 READY-FOR-TAKEOVER

SC-113 Amend subparagraph 12.1.1.2 by adding the following to the end:

“and, where possible, evidence of certification by all permit-issuing authorities, indicating approval of all permitted installations.”

SC-114 Amend subparagraph 12.1.1.3 by adding the words “has been completed by the *Contractor*” at the end.

SC-115 Amend subparagraph 12.1.1.4 by deleting the word “immediate”.

SC-116 Amend subparagraph 12.1.1.6 by adding the words “and commissioning” after the word “testing”.

SC-117 In subparagraph 12.1.1.8 delete the word “scheduled” and replace it with the word “completed” and delete the words “, acting reasonably”.

SC-118 In paragraph 12.1.4 delete the words “10 calendar days” and replace them with the words “10 *Working Days*”.

GC 12.2 EARLY OCCUPANCY BY THE OWNER

SC-119 Delete subparagraphs 12.2.3.2 and 12.2.3.3 in their entirety and replace them as follows:

- “.2 The *Owner* shall, at any and all times, have the right to enter, occupy and use the *Work* in whole or in part before completion of the *Contract*. Such entry, occupation or use shall not be considered as acceptance of the *Work* nor in any way relieve or limit the responsibilities and liabilities of the *Contractor* under the *Contract* nor affect the warranty period.
- .3 For certainty, and notwithstanding occupancy by the *Owner* of a part or entirety of the *Work* before *Ready-for-Takeover* has been attained:
- .1 the *Contractor* shall continue to be liable for the care of such part or entirety of the *Work* except that the *Owner* shall become responsible for preventative maintenance and shall be liable for any loss or damage caused by its negligence or fault; and
 - .2 the warranty period shall be as set out in paragraph 12.3.1 of GC 12.3 – WARRANTY.”

SC-120 Delete paragraph 12.2.4 in its entirety and replace it with the following:

- “12.2.4 Without limiting paragraph 12.2.3, the *Contractor* shall not unreasonably interfere with such use or operation of the *Work* and *Project* by the *Owner*. The *Contractor*, in completing its obligations under the *Contract*, shall, at its own cost, take all reasonable measures to minimize the effect thereof on such use or operation.”

GC 12.3 WARRANTY

SC-121 Delete paragraph 12.3.1 and replace it with the following:

- “12.3.1 The warranty period under the *Contract* is:
- .1 one year from the date when *Ready-for-Takeover* has been achieved or the date of termination of the *Contract* or the *Contractor*'s right to continue with the *Work*; or
 - .2 such longer warranty period established in the *Contract Documents* for extended warranties,
- (the “*Warranty Period*”).”

SC-122 Amend paragraphs 12.3.3 and 12.3.6 by deleting the words “one year warranty period” wherever they appear and replace them with the words “*Warranty Period*”.

SC-123 Delete paragraph 12.3.4 in its entirety and replace with the following:

“12.3.4 Subject to paragraph 12.3.2, within 15 *Working Days* of receipt of *Notice in Writing* pursuant to paragraph 12.3.3 (or within such other reasonable time as determined by the *Consultant*) the *Contractor* shall correct, at the *Contractor*’s expense, any defects or deficiencies in the *Work* which appear prior to and during the *Warranty Period* and shall complete such correction as expeditiously as possible, except that where the deficiency prevents maintaining security at the *Place of the Work* or prevents continued operation or functionality of systems essential to the ongoing business or operations of any *Owner Entities* as determined at the sole discretion of the *Owner*, all necessary corrections and/or installations of temporary replacements shall be carried out immediately as an emergency service. Should the *Contractor* fail to provide this emergency service within 48 hours of a request being made during the normal business hours of the *Contractor*, the *Owner* shall be authorized to carry out all necessary repairs or replacements at the *Contractor*’s expense and deduct all costs of so doing from the *Warranty Security* and, if required, otherwise recover all costs of so doing as a debt due and payable by the *Contractor* upon demand. No such action by the *Owner* shall waive or release the *Contractor* of its obligations under this *Contract*, including any warranty obligations.”

SC-124 Delete paragraph 12.3.5 and replace it with the following:

“12.3.5 The *Contractor* shall correct or pay for damage resulting from corrections made under the requirements of this GC 12.3. If the *Contractor* fails to correct defects or deficiencies in the *Work* or other damage resulting from such corrections within 15 *Working Days* after receiving written notification of the defect or deficiency or damage from the *Owner* or the *Consultant*, the *Owner* may (whether itself or through others) make such corrections at the *Contractor*’s expense and deduct all costs of so doing from the *Warranty Security* and, if required, otherwise recover all costs of so doing as a debt due and payable by the *Contractor* upon demand.”

SC-125 Add new paragraphs 12.3.7 to 12.3.9 as follows:

- “12.3.7 Where manufacturers offer, as a general policy, extended warranties on their *Products* or other greater benefits than those called for in the specifications, the *Contractor* shall obtain the benefit of such extended warranties for the *Owner*. The *Contractor* shall ensure that all warranties, guarantees or other obligations for *Work* or *Products* performed or supplied by any *Contractor Personnel* in connection with the *Work* are obtained and available for the direct benefit of the *Owner*. In the alternative, the *Contractor* shall assign to the *Owner* all warranties, guarantees or other obligations for *Work* or *Products* performed or supplied by any *Contractor Personnel* and such assignment shall be with the consent of the assigning party, where required by law, or by the terms of that *Person's* contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the *Owner* under the *Contract Documents*.
- 12.3.8 To ensure performance of the *Contractor's* obligations as set out in GC 12.3 – WARRANTY, the *Owner* shall not make payment to the *Contractor* of the *Warranty Security* until the following has occurred, as confirmed by the *Consultant* in writing:
- .1 expiry of the *Warranty Period*; and
 - .2 correction by the *Contractor* of all defects and deficiencies in the *Work* which occurred or arose prior to and during the *Warranty Period*.
- 12.3.9 Specified warranty periods shall not be construed as limiting the provisions of GC 13.1 –INDEMNIFICATION. Payment of holdback amounts and final payment shall not relieve the *Contractor's* responsibility for correction of any other deficiencies or incomplete items, at no additional cost to the *Owner* pursuant to this GC12.3 – WARRANTY.”

GC 13.1 INDEMNIFICATION

SC-126 Delete paragraph 13.1.1 and replace it with the following :

- “13.1.1 The *Contractor* shall indemnify and save harmless the *Owner Entities* from and against any and all *Claims* arising out of the negligence, errors, omissions, fraud or willful misconduct of the *Contractor Personnel* attributable to or connected with the *Contractor's* performance or non-performance of its obligations pursuant to this *Contract* except to the extent that such *Claims* are attributable or caused by the negligence of the *Owner Entities* or any of them. This indemnity shall survive the expiration or earlier termination of this *Contract* and continue in full force and effect.”

SC-127 In paragraph 13.1.2 delete the words “The obligation of either party to indemnify as set forth in paragraph 13.1.1” and replace them with the words “The liability of either party under this *Contract*”.

SC-128 In subparagraph 13.1.2.1 delete the words “the minimum liability insurance limit for one occurrence, of the applicable insurance policy, as referred to in CCDC 41 in effect at the time of bid closing” and replace them with the words “the amount of the minimum insurance limit for one occurrence, of the applicable insurance policy, as set forth in Appendix 3 to the Supplementary Conditions for each policy of insurance required to be provided by such party”.

SC-129 Add the following to the end of subparagraph 13.1.2.1:

“For certainty, each party’s liability for losses suffered by the other party for which insurance is to be provided by them pursuant to GC 11.1 – INSURANCE (as modified by the Supplementary Conditions) shall not be less in the aggregate than the total amounts of the minimum insurance limits for one occurrence for each policy of insurance as stipulated in GC 11.1 – INSURANCE (as modified by the Supplementary Conditions) as is applicable to the subject *Claims*.”

SC-130 In subparagraph 13.1.2.3 delete the words “and neither party shall have any liability to the other for indirect, consequential, punitive or exemplary damages”.

SC-131 Add new paragraphs 13.1.7 to 13.1.11 as follows:

“13.1.7 The *Owner Entities* shall have no liability under this *Contract* or in respect of the *Work* or the *Project* for any *Consequential Damages*.

13.1.8 Without limiting the foregoing, within 10 calendar days of the *Contractor* receiving notice or otherwise becoming aware of a *Claim* initiated by a third party against an *Owner Entity* and/or the *Contractor* in respect of a matter for which the *Contractor* has indemnified the *Owner Entities* under this *Contract* and where such *Claim* has been referred to a legal proceeding or other dispute resolution proceeding, the *Contractor* shall retain legal representation and confirm in writing to the *Owner* that it shall assume the *Owner Entities*’ defence in accordance with the indemnification provisions outlined in this *Contract*, including this GC 13.1 – INDEMNIFICATION. For certainty, for the purposes of this GC 13.1 – INDEMNIFICATION “third party” shall not include any *Subcontractor*, *Supplier*, *Other Contractor* or other person or entity engaged for the *Project*.

- 13.1.9 Where the *Contractor* receives notice or otherwise becomes aware of a *Claim* initiated by a third party against an *Owner Entity* and/or the *Contractor* in respect of a matter for which the *Contractor* has indemnified the *Owner Entities* under this *Contract* and where such *Claim* has not been referred to a legal proceeding or other dispute resolution proceeding, if the *Contractor* denies liability and does not assume responsibility for payment of such *Claim* the *Contractor* will notify the *Owner* and third party claimant in writing of its decision within 20 calendar days of receiving notice or otherwise becoming aware of the *Claim*, and the *Owner* reserves the right to assign the *Claim* to an independent insurance adjuster for investigation and determination. The *Owner* and *Contractor* shall fully cooperate with the adjuster to achieve timely resolution of such *Claim*. The *Contractor* and the *Owner* shall provide the adjuster with access to any and all records or documentation in relation to the *Work* and obligations performed under the *Contract* as required for the adjuster's determination. The *Owner* and the *Contractor* acknowledge that all *Claims* will be investigated and responded to by the adjuster within 45 calendar days of receipt of the *Claim* or within such other time as may be agreed by the parties.
- 13.1.10 The *Owner* and the *Contractor* shall be bound by the final decision of the independent adjuster who shall notify the claimant in writing of the final decision with respect to the adjustment of the *Claim*. The *Owner* shall reserve the right to communicate to the third party claimant the final decision with respect to the adjustment of the *Claim*. Where liability is found on the part of the *Contractor*, the adjuster shall handle settlement negotiations and all pertaining financial and legal transactions on behalf of the *Owner* and the *Contractor*, including but not limited to securing a full and final release and issuing the settlement funds to the third party claimant.
- 13.1.11 To the extent the adjuster determines the *Contractor* to be liable for the *Claim* under this *Contract* or at law, all costs for adjuster fees, claim administration and settlement costs will be borne by the *Contractor*. To the extent the *Contractor* is found not to be liable for the *Claim* under this *Contract* or at law, the *Owner* will bear all costs for adjuster fees, claim administration and settlement costs.
- 13.1.12 For certainty, where any *Claim* has been referred to a legal proceeding or other dispute resolution proceeding paragraphs 13.1.8 will apply (and paragraphs 13.1.9 to 13.1.11 shall not apply) and the *Contractor* may advance any denial of liability in the normal course of such proceedings.”

GC 14.1 CONSTRUCTION LIENS

GC 15.1 OWNERSHIP AND CONFIDENTIALITY

GC 16.1 FREEDOM OF INFORMATION

SC-132 Add the following new GC 14.1 CONSTRUCTION LIENS, GC 15.1 OWNERSHIP AND CONFIDENTIALITY and GC 16.1 FREEDOM OF INFORMATION:

“GC 14.1 CONSTRUCTION LIENS

- 14.1.1 In the event that a lien arising from the performance of the *Work* is registered against the *Place of the Work* or *Project* or the *Owner Entities’* interest in the *Place of the Work* or *Project*, the *Contractor* shall, within seven (7) calendar days, at its sole expense, vacate or discharge the lien from title to the *Place of the Work*. If the lien is merely vacated, the *Contractor* shall, if requested, undertake the *Owner Entities’* defence of any subsequent lawsuit commenced in respect of the lien at the *Contractor’s* sole expense. The *Owner Entities* shall have the right to be represented by advisory counsel and other professionals, at its own expense, and shall be kept fully informed by the *Contractor* of the proceeding at all stages thereof whether or not so represented.
- 14.1.2 If the *Contractor* fails or refuses to vacate or discharge a construction lien within the time prescribed above, the *Owner* shall, at its option, be entitled to take all steps necessary to vacate and/or discharge the lien, and all costs incurred by the *Owner Entities* in so doing (including legal fees on a solicitor and client basis and any payment which may ultimately be made out of or pursuant to security posted to vacate the lien) shall be for the account of the *Contractor*, and the *Owner* may deduct such amounts from any amounts otherwise due or owing to the *Contractor*. If the *Owner* vacates the lien, it shall be entitled to retain all amounts it would be required to retain pursuant to the *Payment Legislation* if the lien had not been vacated.
- 14.1.3 Without limiting the generality of the foregoing, the *Contractor* shall indemnify the *Owner Entities* for all costs (including legal fees on a solicitor and client basis) they may occur in connection with the claim of lien or subsequent lawsuit brought in connection with the lien, or in connection with any other claim or lawsuit brought against the *Owner Entities* by any *Contractor Personnel*.
- 14.1.4 This GC 14.1 – CONSTRUCTION LIENS does not apply to liens filed by *Contractor Personnel* that are claimed as a result of any default by the *Owner* to make payments to the *Contractor* in accordance with the terms of the *Contract*.

GC 15.1 OWNERSHIP AND CONFIDENTIALITY

- 15.1.1 Subject to and without limiting paragraph 3.7.5, all *Work*, including all *Products* and all portions thereof, shall be the property of the *Owner*.

- 15.1.2 The *Contractor* grants to the *Owner* an irrevocable, perpetual, worldwide, and exclusive royalty-free license to use the *Deliverables*, including all *Contractor IP* therein, for the *Project*, including: (i) for completion of the *Project* and *Work* in the event of early termination of the *Contract*; and (ii) for the future repair, use, occupancy, expansion, operation, maintenance, and/or modification to the *Project* and *Work*. The licence shall be assignable and transferable by the *Owner* to any *Affiliate* and to any purchaser of all or part of the *Place of the Work* or *Project* provided that such *Person* assumes and agrees in writing to all limitations of use set out herein. The *Owner* may use the *Deliverables* for the purposes provided in this paragraph 15.1.2 whether or not this *Contract* is terminated, provided only that the *Owner* pays the compensation due and owing to the *Contractor* pursuant to this *Contract*. The *Deliverables* may not be reproduced for use for other projects by either party without the express written permission of the other party. The *Contractor* shall ensure that all moral rights to the *Deliverables* have been waived, including by all *Contractor Personnel*. Copies of all *Deliverables* shall be handed over by the *Contractor* to the *Owner* upon the earlier of termination of this *Contract* and submission of the *Contractor's Proper Invoice* for final payment. The *Contractor* agrees to obtain such rights from all *Contractor Personnel* as required so that the *Contractor* can grant the above-noted license.
- 15.1.3 The *Contractor* shall not, without the *Owner's* prior written consent, release or disclose any *Confidential Information* to anyone except as necessary to perform the *Work* and its obligations under this *Contract*, and then, only where the *Person* receiving such information is bound by an obligation of confidentiality consistent with this *Contract*. If any *Contractor Personnel* is required to disclose Confidential Information under a valid order of a *Governmental Authority*, the *Contractor* shall: (i) provide the *Owner* with immediate written notice of any request for disclosure; (ii) cooperate with the *Owner* in its efforts to resist or minimize the *Confidential Information* required to be disclosed; and (iii) take such steps as are reasonably necessary and available to maintain the confidentiality of the information by the *Contractor*.
- 15.1.4 The *Contractor* acknowledges that disclosure or use of the *Confidential Information* in violation of this *Contract* could cause irreparable harm to the *Owner* for which monetary damages may be difficult to ascertain or be an inadequate remedy. The *Contractor* therefore agrees that the *Owner* shall have the right, in addition to its other rights and remedies, to seek injunctive relief for any violation of its confidentiality obligations under this GC 15.1 – OWNERSHIP AND CONFIDENTIALITY.
- 15.1.5 This GC 15.1 – OWNERSHIP AND CONFIDENTIALITY shall survive the completion of the *Work* or the termination of the *Contract* for any reason whatsoever.

GC 16.1 FREEDOM OF INFORMATION & DISCLOSURE

16.1.1 Without limiting the foregoing, the *Owner* represents to *Contractor*, and *Contractor* acknowledges, that the *Owner Entities* are bound by *MFIPPA* and that the law might compel the *Owner Entities* to disclose certain *Confidential Information*. The *Owner Entities* are not required to take steps to oppose or prevent, or assist the *Contractor* in opposing or preventing, any disclosure of information, including *Confidential Information*, which, in the opinion of the *Owner Entities*' counsel, is legally required to be disclosed. *Contractor* shall assist and comply with any notice provided under *MFIPPA* respecting an access request that the *Owner* has received, including providing records and information to the *Owner* that the *Owner* deems to be within its control for the purposes of this *Contract*. If *Contractor* is legally compelled to disclose *Confidential Information*, for example through court order, warrant, or under applicable legislation, *Contractor* shall promptly notify the *Owner* prior to disclosure of any such *Confidential Information* so that the *Owner Entities* have an opportunity, in their sole discretion, to oppose disclosure through any available processes.”

[END OF SUPPLEMENTARY CONDITIONS. APPENDICES FOLLOW.]

**APPENDIX 1 TO THE SUPPLEMENTARY CONDITIONS
AGREEMENT TERM SHEET**

Supplementary Condition	Contract Clause	Description	Term
SC-1	Paragraph 1.3 of Article A-1	<i>Ready-for-Takeover Date</i>	
SC-1	Paragraph 1.3 of Article A-1	<i>Completion Date</i>	
SC-3	Paragraph 4.6 of Article A-4	Percentage of the total amount claimed in each <i>Proper Invoice</i> to be retained by <i>Owner</i> as <i>Warranty Security</i>	
SC-3	Paragraph 4.7 of Article A-4	Amount of liquidated damages per day for each day or part day of delay until <i>Ready-for-Takeover</i> is achieved	
SC-12	Definitions	<i>Owner's Agent</i>	
SC-41	Paragraph 5.1.4 of GC 5.1	Email address(es) for submission of all draft applications for payment and <i>Proper Invoices</i> to <i>Owner</i> and <i>Consultant</i>	
SC-52	Paragraph 5.4.6	Owner election to release holdback on an annual basis	
SC-52	Paragraph 5.4.7	Owner election to release holdback on phased basis	
N/A	N/A	Where <i>Contract Price</i> is less than \$250K, does <i>Owner</i> elect not to take the statutory 10% holdback?	

APPENDIX 2 TO THE SUPPLEMENTARY CONDITIONS PROPER INVOICE REQUIREMENTS

Each *Proper Invoice* submitted by the *Contractor* shall be in the form set out in Exhibit A to this Appendix 2 include the following:

- The *Contractor's* name and address;
- The date of the *Proper Invoice*;
- The period during which the services, products or materials were supplied;
- Identification of the *Contract* and any applicable *Change Order* (being the authority under which the subject work, services, products or materials were supplied);
- A description of the subject work, services, products or materials supplied (including quantity where appropriate);
- The amount payable for the subject work, services, products or materials supplied and the payment terms;
- The name, title, telephone number and mailing address of the person to whom payment is to be sent;
- A statement based on the schedule of values submitted pursuant to paragraph 5.2.4;
- A copy of the current *Construction Schedule* and of any look-ahead schedule required by the *Contract Documents*;
- A copy of the *Contractor's* current and up-to-date certificate of insurance evidencing compliance with GC 11.1.
- Where payment is requested for *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work*, evidence as reasonably required by the *Consultant* to establish the value and delivery of such *Products*;
- Where payment for *Products* prior to their delivery to the *Place of the Work* is approved by the Owner pursuant to paragraph 3.7.7, evidence as the *Consultant* and *Owner* may reasonably require to establish (i) the value of such *Products*; (ii) compliance with paragraph 3.7.8; and (iii) that such *Products* have been ordered by the *Contractor* for the *Project* and are being manufactured, transported or stored prior to their delivery to the *Place of the Work*;
- All documentation required pursuant to GC 10.4 – WORKERS' COMPENSATION, including a clearance certificate from the *WSIB* stating that all amounts owed to date have been paid in full;

- For each *Proper Invoice* submitted after the first, a statutory declaration using the latest CCDC 9A form of “Statutory Declaration of Progress Payment Distribution by Contractor”;
- For a *Proper Invoice* submitted in respect of final payment:
 - copies of all *Deliverables*, including as-built drawings, and copies of all warranties, guarantees and operation and maintenance manuals related to the *Work*, in hard copy and electronic format as requested by the *Owner*; and
 - an executed final waiver and release in the form attached as Exhibit B to this Appendix 2.
- Any other supporting documents required by the *Contract Documents*.

[Exhibits A and B to this Appendix 2 follow]

**EXHIBIT A TO APPENDIX 2 TO THE SUPPLEMENTARY CONDITIONS
PROPER INVOICE TEMPLATE**

See attached.

**EXHIBIT A
PROPER INVOICE TEMPLATE**

INVOICE TEMPLATE

Draft Invoice **Date:** *Insert date draft invoice sent to owner*
Proper Invoice **Date:** *Insert date proper invoice sent to owner*
Payment due Date *Insert date payment due to the contractor*

Owner *Insert owner's name*
Address *Insert owner's address*
Project Manager *Insert owner's project manager's name*

Contract Title *Insert title*
Contract Number *Insert number*
Purchase Order Number *Insert number*
Payment Certificate No. *Insert number*
Work Completed From *Insert period start date*
To *Insert period end date*

Contractor *Insert contractor's legal name*
Contractor's Address *Insert contractor's address*
Remit Payment To Address *Insert remittance address if different from contractor's address*
Project Manager *Insert contractor's project manager's name*
Contact Info *Insert phone number and email*
HST Registration No. *Insert number*

Consultant *Insert consultant's name*
Contract Administrator *Insert consultant's contract administrator's name*

Contract Value (excl. HST) (1) *Insert current contract value including contingency*
Contingency Allowance (2) *Insert current contingency allowance*
Approved Change Orders (3) *Insert value of total approved change orders*
Revised Total Contract Value (4) *(1) - (2) + (3)*
Estimated %age of Work Performed *(Gross payment to date) / (4)*
Contingency Unallocated *(2) - (3)*

	<u>To Date</u>	<u>Previous</u>	<u>Current</u>
Value of Work Performed (excl. Change Orders)	\$ -	\$ -	\$ -
Value of Change Orders Performed	-	-	-
Gross Payment	\$ -	\$ -	\$ -
Less Statutory Holdback (10%)	-	-	-
Release of Statutory Holdback (10%)	-	-	-
Less Finishing Holdback (10%)	-	-	-
Release of Finishing Holdback (10%)	-	-	-
Less Warranty Security	-	-	-
Release of Warranty Security	-	-	-
Less Other Retainers	-	-	-
Release of Other Retainers	-	-	-
Total Net Payment	\$ -	\$ -	\$ -
HST (13%)			-
Less Liquidated Damages	-	-	-
Total Recommended Payment			\$ -

Attachments submitted with this invoice Statutory Declaration
 Progress and Look Ahead Work Schedules per Contract
 WSIB
 Certificate of Insurance
 Tender Price Breakdown/Schedule of Values
 Other _____

Approved by Contractor

Print Name _____

Signature _____

Date _____

**EXHIBIT B TO APPENDIX 2 TO THE SUPPLEMENTARY CONDITIONS
FORM OF FINAL WAIVER AND RELEASE**

TO: [OWNER NAME AND ADDRESS] (“*Owner*”)
FROM: [CONTRACTOR NAME AND ADDRESS] (“*Contractor*”)
DATE OF APPLICATION
FOR FINAL PAYMENT: [●]
RE: CCDC 2 – 2020 Stipulated Price Contract dated [●] (the “**Contract**”)

Except for *Claims* for which *Notice in Writing* has been received by the *Owner* from the *Contractor* prior to the date of the *Contractor*’s application for final payment under the *Contract* (including all such *Claims* listed herein) or *Claims* which the *Contractor* could not reasonably have knowledge of on such date (including the *Contractor*’s claim for any amounts expressly held back by the *Owner* under the *Contract*, including in respect of any unpaid *Warranty Security*), the *Contractor* acknowledges and agrees that:

1. the *Contractor* does not have and will not make any *Claim* for additional compensation under the *Contract*, including without limitation for extras, changes or delays, or any other *Claim* whatsoever against the *Owner Entities* in connection with the *Contract*, the *Project*, or the *Work*;
2. the final payment made by the *Owner* shall be received by the *Contractor* in full and final settlement of the balance due to the *Contractor* under the *Contract* and of any and all *Claims* of the *Contractor* in connection with the *Contract* (except only for the *Contractor*’s claim for any amounts expressly held back by the *Owner* under the *Contract*, including in respect of any unpaid *Warranty Security*); and
3. the *Contractor* gives receipt of full discharge and waives its rights to any and all *Claims* not submitted as of the date of its application for final payment under the *Contract*.

As of the date of this Waiver and Release the *Contractor* has given the *Owner Notice in Writing* of the following *Claims*:

1. [LIST TO BE COMPLETED BY CONTRACTOR]

For certainty, all terms not defined herein shall have the meaning given in the *Contract*.

[CONTRACTOR NAME]

I/we have authority to bind the company

I/we have authority to bind the company

APPENDIX 3 TO THE SUPPLEMENTARY CONDITIONS INSURANCE

Where the original *Contract Price* stipulated in the Agreement is equal to or less than \$5,000,000 the following shall apply:

1. Commercial General liability insurance shall be with limits of not less than \$5,000,000 per occurrence, an aggregate limit of not less than \$5,000,000 within any policy year with respect to completed operations, and a deductible not exceeding \$10,000. The insurance coverage shall not be less than the insurance provided by IBC Form 2100 (including an extension for a standard provincial and territorial form of non-owned automobile liability policy) and IBC Form 2320. To achieve the desired limit, umbrella or excess liability insurance may be used. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
2. Automobile liability insurance in respect of vehicles that are required by law to be insured under a contract by a Motor Vehicle Liability Policy, shall have limits of not less than \$5,000,000 inclusive per occurrence for bodily injury, death and damage to property, covering all vehicles owned or leased by the *Contractor*. Where the policy has been issued pursuant to a government-operated automobile insurance system, the *Contractor* shall provide the *Owner* with confirmation of automobile insurance coverage for all automobiles registered in the name of the *Contractor*.
3. Manned Aircraft and watercraft liability insurance with respect to owned or non-owned aircraft and watercraft (if used directly or indirectly in the performance of the *Work*), including use of additional premises, shall have limits of not less than \$10,000,000 inclusive per occurrence for bodily injury, death and damage to property including loss of use thereof and limits of not less than \$10,000,000 for aircraft passenger hazard. Such insurance shall be in a form acceptable to the *Owner*.
4. Unmanned aerial vehicle liability insurance with respect to owned or non-owned aircraft (if used directly or indirectly in the performance of the *Work*), shall have limits of not less than \$5,000,000 per occurrence or accident for bodily injury, death and damage to property or such amounts as required by any applicable law or regulation.
5. “Broad form Builders Risk” property insurance shall have limits of not less than the sum of 1.1 times *Contract Price* and the full value, as stated in the *Contract*, of *Products* and design services that are specified to be provided by the *Owner* for incorporation into the *Work*, with a deductible not exceeding \$10,000. The insurance coverage shall not be less than the insurance provided by IBC Forms 4042 and 4047 or their equivalent replacement. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
6. Boiler and machinery insurance shall have limits of not less than the replacement value of the permanent or temporary boilers and pressure vessels, and other insurable objects forming part of the *Work*. The insurance coverage shall not be less than the insurance

provided by a comprehensive boiler and machinery policy including hot testing and commissioning.

7. Contractors' equipment insurance coverage written on an "all risks" basis covering *Construction* Equipment used by the *Contractor* for the performance of the *Work*, shall be in a form acceptable to the *Owner* and shall not allow subrogation claims by the insurer against the *Owner*. Subject to satisfactory proof of financial capability by the *Contractor* for self-insurance, the *Owner* may agree to waive the equipment insurance requirement.
8. Contractors' Pollution liability insurance shall have limits of not less than \$5,000,000 per occurrence for bodily injury, death and damage to property, with a deductible not exceeding \$25,000.

Where the original *Contract Price* stipulated in the Agreement is greater than \$5,000,000 and equal to or less than \$25,000,000 the following shall apply:

1. Commercial General liability insurance shall be with limits of not less than \$10,000,000 per occurrence, an aggregate limit of not less than \$10,000,000 within any policy year with respect to completed operations, and a deductible not exceeding \$10,000. The insurance coverage shall not be less than the insurance provided by IBC Form 2100 (including an extension for a standard provincial and territorial form of non-owned automobile liability policy) and IBC Form 2320. To achieve the desired limit, umbrella or excess liability insurance may be used. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
2. Wrap-up liability insurance shall be with limits of not less than \$10,000,000 per occurrence, an aggregate limit of not less than \$10,000,000 within any policy year with respect to completed operations, and a deductible not exceeding \$100,000. The insurance coverage shall not be less than the insurance provided by IBC Form 2100 (including an extension for a standard provincial and territorial form of non-owned automobile liability policy) and IBC Form 2320. To achieve the desired limit, umbrella or excess liability insurance may be used. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
3. Automobile liability insurance in respect of vehicles that are required by law to be insured under a contract by a Motor Vehicle Liability Policy, shall have limits of not less than \$10,000,000 inclusive per occurrence for bodily injury, death and damage to property, covering all vehicles owned or leased by the *Contractor*. Where the policy has been issued pursuant to a government-operated automobile insurance system, the *Contractor* shall provide the *Owner* with confirmation of automobile insurance coverage for all automobiles registered in the name of the *Contractor*.
4. Manned Aircraft and watercraft liability insurance with respect to owned or non-owned aircraft and watercraft (if used directly or indirectly in the performance of the *Work*), including use of additional premises, shall have limits of not less than \$10,000,000 inclusive per occurrence for bodily injury, death and damage to property including loss of

use thereof and limits of not less than \$10,000,000 for aircraft passenger hazard. Such insurance shall be in a form acceptable to the *Owner*.

5. Unmanned aerial vehicle liability insurance with respect to owned or non-owned aircraft (if used directly or indirectly in the performance of the *Work*), shall have limits of not less than \$5,000,000 per occurrence or accident for bodily injury, death and damage to property or such amounts as required by any applicable law or regulation.
6. “Broad form Builders Risk” property insurance shall have limits of not less than the sum of 1.1 times *Contract Price* and the full value, as stated in the *Contract*, of *Products* and design services that are specified to be provided by the *Owner* for incorporation into the *Work*, with a deductible not exceeding \$100,000. The insurance coverage shall not be less than the insurance provided by IBC Forms 4042 and 4047 or their equivalent replacement. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
7. Boiler and machinery insurance shall have limits of not less than the replacement value of the permanent or temporary boilers and pressure vessels, and other insurable objects forming part of the *Work*. The insurance coverage shall not be less than the insurance provided by a comprehensive boiler and machinery policy including hot testing and commissioning.
8. Contractors’ equipment insurance coverage written on an “all risks” basis covering *Construction Equipment* used by the *Contractor* for the performance of the *Work*, shall be in a form acceptable to the *Owner* and shall not allow subrogation claims by the insurer against the *Owner*. Subject to satisfactory proof of financial capability by the *Contractor* for self-insurance, the *Owner* may agree to waive the equipment insurance requirement.
9. Project Specific Contractors’ Pollution liability insurance shall have limits of not less than \$10,000,000 per occurrence for bodily injury, death and damage to property, with a deductible not exceeding \$25,000.

[End of Appendix 3]

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DIVISION 01

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PART 1 - GENERAL

1.1. THE CONTRACT DOCUMENTS

- .1 Division 1 General Requirements, of the Specification generally specify Work and coordination of the Work that is the direct responsibility of the Contractor but shall not be interpreted to define absolutely the limits of responsibility that must be established between the Contractor and their Subcontractors by their separate Agreements.
- .2 Ensure that Subcontractors understand that the General Conditions of Contract, and Division 1 General Requirements, apply to Sections of the Specification governing their Work.
- .3 Ensure that the Work includes all labour, equipment and products required, necessary or normally recognized as necessary for the proper and complete execution of the Work of each trade.
- .4 Work in this Specification is divided into descriptive Sections which are not intended to identify absolute contractual limits between Subcontractor, nor between the General Contractor and their Subcontractors. The Contractor as the Constructor shall organize the division of labour and supply of materials essential to complete the Project in all its parts and provide a complete scope of Work, as established in the General Conditions of Contract.
- .5 As a result, the Consultant shall not be required to decide on questions arising with regard to Agreements or contracts between the Contractor and Subcontractors or Suppliers, nor to the extent of the parts of the Work assigned thereto.
- .6 Further, no extra will be allowed as a result of the failure to coordinate and allocate the Work such that the Work is Provided in accordance with the Contract Documents.
- .7 Wherever the word "building" occurs in the Contract Documents it shall be taken to mean all the buildings included in the Contract.
- .8 Wherever in the Contract Documents the words "approval", "approved", "direction", "directed", "selection", "selected", "request", "requested", "report", and similar words are used, such approvals, directions, selections, requests, and reports shall be given by the Consultant in writing unless specifically stated otherwise.
- .9 Wherever in the Contract Documents the word "supply" is used in any form, it shall mean that the Work specified to be supplied includes delivery to site and unloading at location directed.
- .10 Wherever in the Contract Documents the word "installed" issued in any form, it shall mean that the Work specified for installation includes uncrating, unpacking, etc; moving from stored location to place of installation; and installing to meet specified requirements.
- .11 Wherever in this Specification it is specified that Work is to proceed or to meet approval, direction, selection, or request of authorities having jurisdiction or others, such approval, direction, selection, or request shall be in writing.

- .12 Wherever in this Specification or as directed by the Consultant it is specified that Work shall be repaired, made good or replaced, it shall be performed without any additional cost to the Region.
- .13 Whenever in the Specifications the term "and/or" is used, the Consultant shall decide which of the possible meanings, to be derived at from the sentence where this term occurs shall govern.

1.2. DIVISION 01 – GENERAL REQUIREMENTS

- .1 The provisions of all Sections of Division 01 shall apply to each Section of this Specification.

1.3. STANDARDS AND CODES

- .1 Contract forms, codes, Specifications, standards, manuals and installation, application and maintenance instructions referred to in these Specifications, unless otherwise specified, amended or date suffixed, shall be latest published editions at Contract date.

1.4. LAWS, NOTICES, PERMITS AND FEES

- .1 Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Place of the Work. Codes and regulations form an integral part of the Contract Documents.
- .2 Permits:
 - .1 The Contractor shall obtain and pay for all permits, licenses, deposits, and certificates of inspection as part of the Work, including permits for road closures.
 - .2 Obtain permits required to execute Work on municipal rights of way. Obtain damage deposits for sidewalks, roads, and services, unless otherwise indicated.
- .3 Arrange for inspection, testing and acceptance of the Work required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay costs.
- .4 It is the responsibility of the Contractor to schedule notifications and inspections required by authorities having jurisdiction such that notifications can be properly received and that inspections can be properly undertaken without causing a delay in the Work. The Contractor, at no additional cost to the Region, shall be solely responsible for any delay in the Work caused by failure to properly schedule required notifications and inspection.

1.5. DISCREPANCIES AND CLARIFICATIONS

- .1 Advise Consultant of discrepancies discovered in requirements of the Contract Documents and request clarification from Consultant in written form.

- .2 Advise Consultant when clarifications are required pertaining to meaning or intent of requirements of Contract Documents and request clarification from Consultant in written form.
- .3 Do not proceed with related Work until written clarification is provided by Consultant.
- .4 Failure to notify Consultant shall result in Contractor incurring responsibility for resulting deficiencies and expense at no additional cost to the Region.
- .5 Written instructions issued by Consultant for the purpose of clarification, implicitly supersede applicable and relevant aspects of the Contract Documents irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification instructions

1.6. CONSTRUCTION PROGRESS SCHEDULE

- .1 Meet with Region and Consultant within five (5) working days of Contract award, to discuss proposed approach for undertaking the Work, inclusive of methodology, sequencing, Construction Equipment, and labour resources to be utilized.
- .2 Submit a preliminary as-planned schedule as indicated in Section 01 32 00 - Construction Progress Schedule, within fifteen (15) working days after Contract award.
- .3 Once preliminary as-planned schedule is approved and the final as-planned schedule is created, record "progress to date" on a copy of schedule to be available at the Site. Inspect Work with the Region and the Consultant at least bi-weekly to establish progress on each current activity.
- .4 The Contractor's schedule is to be updated and resubmitted to the Consultant as a progress schedule at least once per month, on a date to be mutually agreed by the Contractor and the Consultant.

1.7. CONSTRUCTION SEQUENCE

- .1 General:
 - .1 All Work shall be performed in a manner to maintain the existing building systems in operation throughout the Construction period. Refer to Specification section 01 14 00 – Work Restrictions for the normal business hours of the building.
 - .2 Work will be carried out Monday to Friday, 8:00 a.m. to 5:00 p.m., unless otherwise approved by the Region. Working times must be coordinated with the Region's Representative prior to commencement of Work. Craning activities are to be performed on weekends that have been coordinated with the Halton Region Project Manager.
 - .3 This is an occupied site, and normal operations must be maintained during the Work. Take proper care to avoid unnecessary noise, clatter or obstruction in the corridors, walkways, sidewalks, and roadways. Do not interfere with the use or safe passage to and from the building and adjacent public sidewalks and roads. Do not unreasonably encumber site with materials or equipment. Where excessive noise or obstruction is in certain instances unavoidable,

- advise the Region Representative ahead of time and make suitable arrangements.
- .4 Site office and parking may be provided on site at location acceptable to the Region's Representative. Provide and pay for additional parking, if required.
 - .5 Ensure that privileges presently accruing to adjacent properties are maintained.
 - .6 Do not transport materials through the building without prior approval from the Region's Representative. Access to the building and elevators, storage space for material and tools will be as specified by the Region's Representative.
 - .7 Access and egress from the site shall be as per prescribed routes only. Provide and arrange for traffic control where necessary for delivery of materials, removal of garbage, etc. as required by the Region's Representative and as required by the laws, ordinances, rules, and regulations relating to the Work.
 - .8 No signs of advertisement other than warning signs are permitted on site unless approved by the Region.
 - .9 Limited to areas for Work and storage as directed by the Region.
 - .10 Do not unreasonably encumber site with materials or equipment.
 - .11 Do not obstruct entrances, stairs or fire exits.
 - .12 Maintain free access route for fire, ambulance, and garbage trucks.
 - .13 Limited parking will be allowed on site in locations designated by Region.
 - .14 The placement of refuse bin will be allowed in an area agreed to with the Region.
 - .15 Make good any damage to paving, grass, walkways, curbs, trees, planting beds, etc. caused due to the Work of this Contract at no additional cost to the contract.
 - .16 System tie-ins shall be performed 08:00 to 17:00, Monday through Friday. Provide a minimum of 48 hours advance notice to the Region. System tie-ins which require a building shutdown shall be performed outside of business hours (ie. weekends and evenings). The systems shall be returned to an operational status before the start of business the next day.
 - .17 The Contractor shall provide protection (i.e. drop sheets, tarps, hoarding, etc.) as required to protect Owner fixed and non-fixed assets remaining within the areas of Work. The Contractor shall not stand and/or utilize these assets for working platforms.
 - .18 Coordinate all aspects of the Work with the Owner's and Consultant's Project Managers.
 - .19 Where the scope of Work under this project affects the operation of the existing building systems; it's the Contractors responsibility to operate such system

until the finished products and/or systems have been turned back over to the Region, including but not limited to commissioning, training, and operation and maintenance manuals. If assistance is required by the Owner's staff, 72 hours' notice shall be given to Owner.

.2 Scope of Work

.1 General

- .1 Perform scanning of all suspended floor slabs, and walls as may be applicable prior to core drilling to locate reinforcement, electrical cables or any other object embedded in the concrete.
- .2 Repair and make good all existing building elements and finishes affected by the Work of this project to match the pre-existing conditions.

.2 Rooftop Units (RTU-1 & RTU-2) Replacement (Schedule of Prices No. 1.0)

.1 Demolition

- .1 Disconnect, remove, and dispose of the existing natural gas fired, direct expansion cooling packaged rooftop units complete with natural gas piping, power distribution, and controls to the extent indicated on the plans. Repair and make good the existing roof curbs suitable for reuse. Make good the existing to remain system components suitable for reuse.

.2 New Construction

- .1 Supply, install, balance, and commission new roof mounted air source heat pumps on the existing roof curbs as indicated on the plans and as specified herein. Field measure the existing to remain roof curbs and coordinate with the equipment manufacturer. Modify and extend the existing ductwork, power distribution, and controls to match the new unit.
- .2 Supply and install a new power distribution system as indicated on the drawings for the air source heat pumps and their associated supplementary electric heating.

.3 Make-Up Air Units (MUA-1, MUA-2, & MUA-3) Replacement (Schedule of Prices No. 2.0)

.1 Demolition

- .1 Disconnect, remove, and dispose of the existing natural gas fired indirect make-up air units complete with outdoor and supply air ductwork, thermal insulation, natural gas piping, flue gas venting, combustion air intakes, power distribution, duct mounted smoke detector, and controls, to the extent

indicated on the plans. Make good the existing to remain system components suitable for reuse.

- .2 Remove, and dispose of the existing concrete housekeeping curbs corresponding to the make-up air units. Grind smooth the existing suspended concrete floor slab suitable for re-finishing.
 - .3 Disconnect, remove, store, and protect the existing outdoor air intake louvre and the existing plenum mounted axial exhaust fan complete with all accessories corresponding to the west building elevation. Disconnect, remove, and dispose of all outdoor air ductwork including the plenum.
 - .4 Remove, salvage, and store the existing concrete block wall and exterior cladding from the bottom of the louvre to the top surface of the mezzanine floor slab to facilitate unit removal and installation. Do not modify, alter, and/or cut the existing to remain structural elements. Provide shoring of the existing to remain lintel as required. All shoring is to be designed and sealed by a Professional Engineer licensed in the Province of Ontario.
- .2 New Construction
- .1 Supply, install, balance, and commission new indoor floor mounted natural gas fired, high efficiency (condensing operation) indirect fired make-up air units on new concrete housekeeping curbs as indicated on the plans and as specified herein. Modify and extend the existing ductwork, natural gas, power distribution, fire alarm, and controls to suit the new unit. Provide new duct mounted smoke detectors connected to the existing to remain fire alarm zones.
 - .2 Supply and install new flue gas venting and combustion air intakes in accordance with the manufacturer's requirements and as specified herein. Reuse the existing roof penetrations as required complete with required supports, cone flashings, and weatherproofing.
 - .3 Supply and install a new condensate drainage system complete with acid neutralizer, thermal insulation, and sanitary waste and vent piping as indicated on the plans. Core drill and repair the existing suspended concrete slab as required to provide new sanitary waste and vent piping including connection to the existing sanitary waste.
 - .4 Reinstate the existing outdoor air intake louvre complete with associated components, concrete block wall, and exterior building finishes to match the pre-existing conditions and as specified herein. Supply and install a new thermally insulated outdoor air intake plenum.

- .5 Reinststate the existing axial exhaust fan in the new intake plenum complete with all associated controls and power distribution.
- .4 Exhaust Fans Replacement (Schedule of Prices No. 3.0)
 - .1 Demolition
 - .1 Disconnect, remove, and dispose of the existing exhaust fans identified on the drawings. Make good the existing ductwork, roof curb/support assembly, power distribution, and controls suitable for reuse.
 - .2 Disconnect, remove, and dispose of the existing roof level outdoor air intake hoods serving MUA-1 and MUA-2. Make good the existing ductwork, and roof curb suit able for reuse.
 - .2 New Construction
 - .1 Supply, install, balance, and commission new exhaust fans complete with new adapter curbs/supports as indicated on the drawings. Reconnect the new fans to the existing ductwork, power distribution, and controls.
 - .2 Supply and install two (2) new outdoor air intakes complete with adapter curbs. Reconnect the hoods to the existing ductwork.
- .5 Heat Pump Replacement (Schedule of Prices No. 4.0)
 - .1 Demolition
 - .1 Disconnect, remove, and dispose of the existing air-cooled condensing unit, and indoor wall cassette complete with all associated piping, power distribution, and controls.
 - .2 New Construction
 - .1 Supply, install, and commission a new roof level air-cooled condensing unit, and two (2) indoor wall cassettes complete with all refrigerant piping, condensate drainage, power distribution, indoor and outdoor interlock connections, and controls. Include new conduit and cabling for controls and power distribution.
- .6 Primary Hydronic Pump Replacement (Schedule of Prices No. 5.0)
 - .1 Demolition
 - .1 Disconnect, remove, and dispose of the existing primary and secondary circulating pumps including power distribution and controls. Make good the existing hydronic piping, controls and power distribution suitable for reuse.

.2 New Construction

- .1 Supply, install, balance, and commission new primary and secondary hydronic pumps including reconnection of the existing piping, controls, and power supply.

1.8. SITE PROGRESS RECORDS

- .1 Maintain at site a permanent written record of progress of Work. Make the record available at all times with copies provided when requested. Include in record each day:
- .1 Weather conditions with maximum and minimum temperatures.
 - .2 Conditions encountered during excavation. Record quantities pumped for dewatering.
 - .3 Commencement and completion dates of the Work of each trade in each area of Project.
 - .4 Erection and removal dates of formwork in each area of Project.
 - .5 Dates, quantities, and particulars of each concrete pour.
 - .6 Dates, quantities, and particulars of waterproofing installation.
 - .7 Dates, quantities, and particulars of roofing installation.
 - .8 Attendance of Contractor's and Subcontractor's Work forces at Project and a record of the Work they perform.
 - .9 Dates, status and particulars of submissions, i.e. shop drawings, samples, mock-ups and the like.
 - .10 Dates, status and particulars of deliveries, i.e. manufacturing dates, delivery and installation dates.
 - .11 Visits to site by Region, Consultant, authorities having jurisdiction, testing companies, Contractor, Subcontractors, and suppliers.
- .2 Maintain a progress chart in approved format. Show on chart proposed Work schedule and progress of Work by Contractor and Subcontractor. The status of delivery items, i.e. shop drawings status, manufacture dates - delivery and installation dates

1.9. DOCUMENTS AT THE PLACE OF WORK

- .1 Maintain at the Place of the Work, one copy of each of following:
- .1 Contract Documents including drawings, Specifications, addenda, and other modifications to the Contract, including copies of standards and codes referenced in the Contract Documents.

-
- .2 'Reviewed' or 'Reviewed as Modified' shop drawings. Refer to Section 01 33 00 – Submittal Procedures for details of schedules required.
 - .3 Construction, inspection and testing, and submittal schedules.
 - .4 Supplemental Instructions, proposed Change Orders, Change Orders, and Change Directives.
 - .5 Field Test Reports.
 - .6 Consultant's field review reports and deficiency reports.
 - .7 Reports by authorities having jurisdiction.
 - .8 Building and other applicable permits, and related permit documents.
 - .9 Daily log of the Work.
 - .10 As-built drawings recording as-built conditions, instructions, changes, and the like, as called for in Section 01 33 00 – Submittal Procedures, prior to being concealed.
- .2 Make above material available to Consultant upon request.
- 1.10. TRADEMARK AND LABELS
- .1 Trademarks and labels, including applied labels, shall not be visible in finished Work in finished areas, unless otherwise accepted or indicated by Consultant.
- 1.11. EXAMINATION
- .1 Examine site and ensure that each Section performing Work related to site conditions has examined it, so that all are fully informed on all particulars which affect the Project Work (thereon and at the place of the building, and in order that Construction proceeds competently and expeditiously).
 - .2 Ensure by examination that all physical features at the Work, and working restrictions and limitations which exist are known, so that the Region is not restricted in their use of the premises for their needs.
 - .3 Previously Completed Work:
 - .1 Where dimensions are required for proper fabrication, verify dimensions of completed Work in place before fabrication and installation of Work to be incorporated with it.
 - .2 Verify that previously executed Work and surfaces are satisfactory for installation or application, or both, and that performance of subsequent Work will not be adversely affected.
 - .3 Ensure that Work installed in an unsatisfactory manner is rectified by those responsible for its installation before further Work proceeds.

- .4 Commencement of Work will constitute acceptance of site conditions and previously executed Work as satisfactory.
- .5 Defective Work resulting from application to, or installation on, or incorporation with, unsatisfactory previous Work will be considered the responsibility of those performing the later Work.
- .4 Construction Measurements:
 - .1 Take site dimensions of completed Work before installation of Work to be incorporated commences.
 - .2 Before commencing installation of Work, verify that its layout is accurately in accordance with intent of Drawings, and that positions, levels, and clearances to adjacent Work are maintained.
 - .3 Before commencing Work, verify that all clearances required by authorities having jurisdiction can be maintained.
 - .4 If Work is installed in wrong location, rectify it before Construction continues.
 - .5 Where dimensions are not available before fabrication commences, the dimensions required shall be agreed upon between the trades concerned.
 - .6 All measurements shall be Imperial.

1.12. PROTECTION OF WORK, PROPERTY AND PERSONS

- .1 Include in Work necessary methods, materials, and Construction to ensure that no damage or harm to Work, materials, property and persons results from the Work of this Contract.
- .2 Comply with all instructions and/or orders issued by authorities having jurisdiction.
- .3 Ensure that compulsory wearing of hard hats and safety boots is observed by all persons employed on the Work. Provide spare hard hats for visitors, refuse admission to the premises to those refusing to wear same.
- .4 Keep excavations, and pits free of rainwater, ground water, backing up of drains and sewers, and all other water. Pump dry as required.
- .5 Protect adjacent private and public property from damage and, if damaged, make good immediately. Make good private property to match in all details its original condition in material and finishes as approved, and public property in accordance with requirements specified and/or instructed by its Region or as directed by the Consultant.
- .6 Keep surfaces, on which finish materials will be applied, free from grease, oil, and other contamination which would be detrimental in any way to the application of finish materials.
- .7 Do not apply visible markings to surfaces exposed to view in finished state or that receive transparent finishes.

- .8 Protect surfaces of completed Work exposed to view from staining, disfigurement and all other damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Subcontractor the suitability of such protection in each case.
- .9 Brace and shore masonry walls until their designed lateral support is incorporated at both top and bottom, in accordance with safe Construction practices.
- .10 Enforce fire prevention methods at site for new Work maintain existing in accordance with local authorities having jurisdiction. Do not permit bonfires, open flame heating devices or accumulation of debris. Use flammable materials only if proper safety precautions are taken, both in use and storage.
- .11 Do not store flammable materials in the building. Take necessary measures to prevent spontaneous combustion. Place cloths and other disposable materials that are a fire hazard in closed metal containers and remove them from the building every night.
- .12 Where flammable materials are being applied, ensure that adequate ventilation is provided, spark-proof equipment is used, and smoking and open flames are prohibited.
- .13 Ensure that volatile fluid wastes are not disposed of in storm or sanitary sewers or in open drain courses.
- .14 Public Utilities and Services:
 - .1 Verify location of and limitations imposed by, existing mechanical, electrical, telephone and similar services, and protect them from damage. If necessary, relocate active services to ensure that they function continuously wherever possible in safety and without risk of damage or down time to the existing buildings.
 - .2 Cap off and remove unused utility services encountered during Work after approval is given by the utilities concerned or authorities having jurisdiction, which ever may apply. Relocation, removal, protection and capping of existing utility services shall be performed only by the applicable utility, and of other services by licensed mechanics.
 - .3 Make arrangements and pay for connection charges for services required for the Work.
- .15 Ensure that precautions are taken to prevent leakage and spillage from plumbing and mechanical Work that may damage surfaces and materials finished or unfinished.
- .16 Give constant close supervision to roofing/waterproofing membranes following their installation, during the time they are temporarily protected or exposed, to ensure that no damage occurs to them before completion of building.
- .17 Prevent spread of dust beyond the Construction site by wetting, or by other approved means, as required or as directed by the Consultant and/or authorities having jurisdiction.

- .18 Make good roads, soft landscaping, walkways, curbs, sidewalks, possessions and property, soiled or damaged due to the Work, to requirements of authorities having jurisdiction and requirements of and Making Good, as applicable.

1.13. INSERTS, ANCHORS AND FASTENINGS

- .1 Include in the Work of each Section necessary fastenings, anchors, inserts, attachment accessories, and adhesives. Where installation of devices is in Work of other Sections, deliver devices in ample time for installation, locate devices for other Sections and co-operate with other Sections as they require.
- .2 Do not install wood plugs or blocking for fastenings in masonry, concrete, or metal Construction, unless specified or indicated on the drawings.
- .3 Do not use fastenings which cause spalling or cracking of materials in which they are installed. Do not use powder actuated fastening devices unless specified or prior written approval is given by the Consultant for each specific use.
- .4 Use only approved driven fasteners.
- .5 Install metal-to-metal fastenings fabricated of the same metal or of a metal which will not set up electrolytic action causing damage to fastenings or components, or both. Use non-corrosive or galvanized steel fastenings for exterior Work, and where attached to, or contained within, exterior walls and slabs. Leave steel anchors bare where cast in concrete.
- .6 Install Work with fastenings or adhesives in sufficient quantity to ensure permanent secure anchorage of materials, components, and equipment. Space anchors within limits of load bearing or shear capacity.
- .7 Space exposed fastenings evenly and in an organized pattern. Keep number to a minimum. Provide exposed metal fastenings of same material, texture, colour and finish as metal on which they occur.
- .8 At fastenings that penetrate metal roof deck, ensure that penetrations are sealed airtight with approved sealant.
- .9 Galvanize steel anchors in masonry and at exterior of building, unless otherwise specified elsewhere. Leave steel anchors bare where cast in concrete.

1.14. CLEANING

- .1 Ensure that spatters, droppings, soil, labels, and debris are removed from surfaces to receive finishes before they set up. Leave Work and adjacent finished Work in new condition.
- .2 Use only cleaning materials which are recommended for the intended purpose by both the manufacturer of the surface to be cleaned and by the cleaning material supplier.
- .3 Maintain areas "broom clean" at all times during the Work. Vacuum clean interior areas immediately before finish painting commences.

- .4 Do not burn or bury waste material at site. Remove as often as required to avoid accumulation.
- .5 Do not allow waste material and debris to accumulate in an unsightly or hazardous manner. Sprinkle dusty accumulations with water or other approved materials during removal of same.
- .6 Control lowering of materials. Use as few handlings as possible. Do not drop or throw materials from storeys above grade.
- .7 Ensure that cleaning operations are scheduled to avoid deposit of dust or other foreign matter or surfaces during finishing Work and until wet or tacky surfaces are cured.
- .8 Each Section shall supply the Contractor with instructions for final cleaning of their Work, and for inclusion in Project Data Book as specified in each trade Section and in Section 01 33 00.
- .9 Contractor shall perform final cleaning one (1) week prior to opening the project to the public and shall include cleaning of all Work as required by each trade. Co-ordinate final cleaning with Region's maintenance staff.

1.15. ADJUSTING

- .1 Ensure that all parts of Work fit snugly, accurately and in true planes, and that moving parts operate positively and freely, without binding and scraping.
- .2 Verify that Work functions properly and adjust it accordingly to ensure satisfactory operation.
- .3 Lubricate products as recommended by the supplier.

1.16. SALVAGE

- .1 Unless otherwise specified, surplus material resulting from Construction, and Construction debris shall become the property of Contractor, who shall dispose of it away from site.
- .2 Treasure, such as coins, bills, papers of value, and articles of antiquity, discovered during digging, demolition and cutting at the site shall remain property of Region, and shall be delivered immediately into their custody.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. ACCESS AND EGRESS

- .1 Design, construct, and maintain temporary "access to" and "egress from" Work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial, and other regulations.

1.2. USE OF SITE FACILITIES

- .1 Execute Work with the least possible interference or disturbance to normal use of premises. Make arrangements with Region to facilitate Work as stated.
- .2 Maintain existing services to the site and provide for personnel and vehicle access.
- .3 Where security is reduced by Work provide temporary means to maintain security.
- .4 The Contractor shall utilize only the sanitary facilities designated by the Region and shall be responsible for the cleanliness and maintenance.
- .5 Closures: protect Work temporarily until permanent enclosures are completed.
- .6 Any areas of the building where contractor shared access/space (including but not limited to public/staff corridors, lobbies, etc.) might occur within the same access/space as staff/occupants during regular Work hours that Work must be done after hours. This includes but not limited to activities in these shared access/spaces of; Construction Work, carrying/leaving Construction supplies/materials, carrying/leaving equipment, carrying/leaving tools, etc., that may deem the space a Construction space where full personal protective equipment (PPE), and Construction health and safety policies need to be followed under the project. If the access/space can be shown by the contractor and plan approved by the Region that the required Construction access/spaces can be separated by a barrier including hoarding for such spaces and is not a nuisance, then approval may be granted to do the Work during the day.

1.3. EXISTING SERVICES

- .1 Notify Consultant and Region and utility companies of intended interruption of services and obtain required permission(s).
- .2 Where Work involves breaking into or connecting to existing services, give Consultant and Region seventy-two (72) hours of notice for necessary interruption of mechanical or electrical service throughout the course of the Work. Keep the duration of interruptions to a minimum.
- .3 Provide for personnel and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.4. ALTERATIONS, ADDITIONS OR REPAIRS TO THE EXISTING BUILDING

- .1 Execute Work with the least possible interference or disturbance to the building operations, occupants, public, and normal use of premises. Arrange with the Region and/or the Consultant to facilitate the execution of the Work.

1.5. SPECIAL REQUIREMENTS

- .1 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic, and security regulations.
- .2 Keep within the limits of Work and avenues of ingress and egress.
- .3 All Work which generates noise, dust and/or disruptions shall be performed during regular business hours.

1.6. BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is permitted only in designated smoking areas.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions GC3.1.

1.2. ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the Work.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four (4) days in advance of meeting date to Consultant and Region.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and, affected parties not in attendance including the Region and Consultant.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3. PRE-CONSTRUCTION MEETING

- .1 Within fifteen (15) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of Region, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance Section 01 32 00 - Construction Progress Schedules - Bar (GANTT) Chart.

- .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Delivery schedule of specified equipment in accordance with applicable Sections.
- .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Region provided products.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 – Closeout Submittals.
- .12 Monthly progress claims, administrative procedures, photographs, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies

1.4. PROGRESS MEETINGS

- .1 During course of Work, schedule progress meetings bi-weekly.
- .2 Contractor, major Subcontractors involved in Work, Consultant and Region are to be in attendance.
- .3 Notify parties' minimum four (4) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three days after meeting.
- .5 Agenda to include the 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 Other business.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions GC3.4.

1.2. DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANNT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, Work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five-day Work week and define schedule calendar working days as part of Bar (GANNT) Chart submission.
- .5 Duration: number of Work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Consultant to enable monitoring of project Work in relation to established milestones.

1.3. REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.

- .3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.4. ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit to Consultant within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring, and reporting of project progress.
- .3 Submit Project Schedule to Consultant within ten (10) working days of receipt of acceptance of Master Plan.

1.5. MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Consultant will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within five (5) working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6. PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Mobilization.
 - .4 Electrical.
 - .5 Controls.
 - .6 Plumbing and Drainage
 - .7 Heating, Ventilating, and Air Conditioning.
 - .8 Power Distribution
 - .9 Fire Alarm

.10 Testing and Commissioning

1.7. PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays, and impact with possible mitigation.

1.8. PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions

1.2. ADMINISTRATIVE

- .1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Shop drawings shall be submitted in an electronic PDF format to the Consultant for review. No hardcopies are required.
- .3 Contractor is to submit a shop drawing submission schedule to the Consultant for review and comments prior to start of Construction.
- .4 Do not proceed with Work affected by submittal until review is complete.
- .5 Present shop drawings, product data, samples, and mock-ups in SI Metric units.
- .6 Where items or information is not produced in SI Metric units converted values are acceptable.
- .7 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. Submittals not stamped, signed, dated, and identified as to specific project will be returned without being examined and considered rejected.
- .8 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .9 Verify field measurements and affected adjacent Work are co-ordinated.
- .10 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .11 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .12 Keep one reviewed copy of each submission on site.

1.3. SHOP DRAWINGS AND PRODUCT DATA

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions GC3.8.

- .2 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.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Ontario, Canada.
- .4 Indicate materials, methods of Construction and attachment or anchorage, erection diagrams, connections, explanatory notes, and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and Specifications.
- .5 Allow seven (7) days for Consultant's review of each submission.
- .6 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.
- .7 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.
- .8 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.
- .9 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent Work.
- .10 After Consultant's review, distribute copies.
- .11 Submit one (1) electronic copy of shop drawings for each requirement requested in Specification Sections and as Consultant may reasonably request.
- .12 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .13 Submit one (1) electronic copy of test reports for requirements requested in Specification Sections and as requested by the Consultant.
 - .1 Report signed by authorized official of testing laboratory that material, product, or system identical to material, product, or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within three (3) years of date of contract award for project.
- .14 Submit one (1) electronic copy of certificates for requirements requested in Specification Sections and as requested by Consultant.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets Specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.

- .15 Submit one (1) electronic copy of manufacturer's instructions for requirements requested in Specification Sections and as requested by Consultant.
 - .1 Pre-printed material describing installation of product, system, or material, including special notices and Material Safety Data Sheets concerning impedances, hazards, and safety precautions.
- .16 Submit one (1) electronic copy of Manufacturer's Field Reports for requirements requested in Specification Sections and as requested by Consultant.
- .17 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .18 Submit one (1) electronic copy of Operation and Maintenance Data for requirements requested in Specification Sections and as requested by Consultant.
- .19 Delete information not applicable to project.
- .20 Supplement standard information to provide details applicable to project.
- .21 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .22 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of Construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of Construction and installation and for co-ordination of Work of sub-trades.

1.4. PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format and standard resolution, monthly with progress statement and as directed by Consultant.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 4 locations.
 - .1 Viewpoints and their location as determined by Consultant.
- .4 Frequency of photographic documentation: weekly as directed by Consultant.

- .1 Upon completion of excavation, foundation, framing and services before concealment of Work and as directed by Consultant.

1.5. CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after Letter of Intent from the Region, submit Workers' Compensation Board status.
- .2 Submit after Letter of Intent from the Region, transcription of insurance immediately after award of Contract.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.

1.2. ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within seven (7) days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site-specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in Work plan.
- .3 Submit THREE (3) copies of Contractor's authorized representative's Work site health and safety inspection reports to Consultant, Region and authority having jurisdiction, weekly.
- .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 WHMIS MSDS - Material Safety Data Sheets.
- .7 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within 7 days after receipt of comments from Consultant.
- .8 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.
- .9 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.

- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations at a minimum.
 - .1 Fire.
 - .2 Flood.
 - .3 High voltage

1.3. FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work. Pay all costs related to filing Notice of Project.
- .2 The Contractor must provide a Notice of Project (NOP) to the Ministry of Labour (MOL) prior to starting projects that meet the standards set out in section 6(1) of the Regulation for Construction Project, O. Reg. 213/91 (the Regulation).
- .3 A Notice of Project is required if:
 - .1 The project has a total cost of labour and materials expected to exceed \$50,000.00.
 - .2 The Work is the erection or structural alteration of a building more than two storeys or more than 7.5 metres high.
 - .3 The Work is the demolition of a building at least 4 metres high with a floor area of at least 30 square metres.
 - .4 The Work is the erection, structural alteration or structural repair of a bridge, an earth retaining structure or a water-retaining structure more than 3 metres high or of a silo, chimney, or a similar structure more than 7.5 metres high.
 - .5 Work in compressed air is to be done at the project.
 - .6 A tunnel, caisson, cofferdam or well into which a person may enter is to be constructed at the project.
 - .7 A trench into which a person may enter is to be excavated at the project and the trench is more than 300 metres long or more than 1.2 metres deep and over 30 metres long.

or
 - .8 A part of the permanent or temporary Work is required by this Regulation to be designed by a professional engineer.
- .4 Posting and additional notification requirements
 - .1 You must print a copy of the Notice of Project, sign and post it at the project or make it available at the project for review by a Ministry of Labour inspector.

-
- .2 Estimated cost of labour and materials, including the labour and materials of all Subcontractors must be entered where required. The estimated cost will not be printed on your copy of the Notice of Project.
 - .3 If section 6 of the Regulation does not apply to a project, but the project includes Work on a trench more than 1.2 metres deep into which a Worker may enter, the Contractor shall, before any Work at the project is begun, give notice in person, by telephone or by fax to the Ministry of Labour office located nearest to the project.
 - .4 Contact the MOL office nearest the project to notify the Ministry and to obtain your Notification Number prior to starting the operation for projects involving:
 - .1 Trenching.
 - .2 Multi-tiered lifts as defined by section 103.1 of the Regulation.
 - .3 Use of cranes to lift Workers (section 153 (11)).
 - .4 Dismantling of multi-point suspended scaffolds.
 - .5 Window cleaning; or
 - .6 Type 3 asbestos operations and type 2 asbestos glove bag removals of less than one square metre.
 - .5 Note: In case of an emergency the Work at the project may be started if the information required is provided to the Ministry by phone or by fax. For details, please refer to Section -6(5) of Ontario Regulation -213/91 for Construction projects.
- 1.4. SAFETY ASSESSMENT
- .1 Perform site specific safety hazard assessment related to project.
- 1.5. MEETINGS
- .1 Schedule and administer Health and Safety meeting with Consultant and Region prior to commencement of Work.
- 1.6. REGULATORY REQUIREMENTS
- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.
- 1.7. PROJECT/SITE MEETINGS
- .1 Work at site may involve contact with, but is not limited to:
 - .1 Internal site traffic.
 - .2 High voltage.
- 1.8. GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project Specifications.
- .2 Consultant may respond in writing, where deficiencies or concerns are noted and may request resubmission with correction of deficiencies or concerns.

1.9. RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial, and local statutes, regulations, and ordinances, and with site specific Health and Safety Plan.

1.10. COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Health and Safety Act, R.S.O.
- .2 Comply with Occupational Health and Safety Regulations.
- .3 Comply with Occupational Health and Safety Act, General Safety Regulations.
- .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11. UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Consultant verbally and in writing.

1.12. 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 working knowledge of occupational safety and health regulations.
 - .2 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.
 - .3 Be responsible for implementing, enforcing daily, and monitoring site-specific Contractor's Health and Safety Plan.
 - .4 Be on site during execution of Work.

1.13. 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 Province having jurisdiction, and in consultation with Consultant.

1.14. CORRECTION OF NON-COMPLIANCE

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

1.15. BLASTING

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Consultant.

1.16. POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Consultant.

1.17. 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.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

.1 Definitions:

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during Construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

.2 Reference Standards:

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions.
- .2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter.

1.2. ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing Construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by Consultant.
- .3 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during Construction.
- .4 Address topics at level of detail commensurate with environmental issue and required Construction task[s].
- .5 Include in Environmental Protection Plan:
 - .1 Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from site.
 - .3 Name[s] and qualifications of person[s] responsible for training site personnel.

- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws, and regulations [EPA 832/R-92-005, Chapter 3 requirements].
- .6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by Construction traffic, especially during wet weather. Ensure plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized Work areas.
- .9 Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .13 Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from Construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources, and wetlands.
- .15 Pesticide treatment plan to be included and updated, as required.

1.3. FIRES

- .1 Fires and burning of rubbish on site is not permitted.
- .2 Provide supervision, attendance and fire protection measures as directed.

1.4. DRAINAGE

- .1 Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 requirements.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5. SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Wrap in burlap, trees, and shrubs adjacent to Construction Work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Consultant.

1.6. POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
- .4 Provide temporary enclosures where directed by Consultant.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7. NOTIFICATION

- .1 Consultant will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Consultant and Region of proposed corrective action and take such action for approval by Consultant.
 - .1 Do not take action until after receipt of written approval by Consultant.
- .3 Consultant will issue stop order of Work until satisfactory corrective action has been taken.
- .4 No time extensions granted, or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling.
- .3 Rubbish and waste materials are not permitted to be buried on site.
- .4 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES AND CODES

- .1 Perform Work in accordance with Ontario Building Code 2012 (OBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2. HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop Work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition Work. Notify Consultant.
- .2 PCB: Polychlorinated Biphenyl: stop Work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition Work. Notify Consultant.
- .3 Mould: stop Work immediately when material resembling mould is encountered during demolition Work. Notify Consultant.

1.3. BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2. ACTION AND INFORMATIONAL SUBMITTALS

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

1.3. INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute Work expeditiously.
- .2 Remove from site all such Work after use.
- .3 Maintain temporary utilities and plant in good operating order.

1.4. WATER SUPPLY

- .1 Region will provide continuous supply of potable water for Construction use.

1.5. TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, and data hook up, lines and equipment necessary for own use and use of Consultant. The use of cellular/wireless telephones is acceptable.

1.6. FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations, and bylaws.
- .2 Burning rubbish and Construction waste materials is not permitted on site.
- .3 Provide a fire watch when fire protection and/or alarm systems have been interrupted to perform the Work of this project.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2. ACTION AND INFORMATIONAL SUBMITTALS

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

1.3. INSTALLATION AND REMOVALS

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide Construction facilities in order to execute Work expeditiously.
- .5 Remove from site all such Work after use.

1.4. SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.

- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs.

1.5. HOISTING

- .1 Provide, operate, and maintain hoists and cranes required for moving of workers, materials, and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists and cranes to be operated by qualified operator.

1.6. SITE STORAGE AND LOADING

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions GC3.7.
- .2 Confine Work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .3 Do not load or permit to load any part of Work with weight or force that will endanger Work or any part of existing structures, components, or elements.
- .4 The Contractor shall provide, maintain, and remove chutes for the disposal of debris from several floor levels, for the use of Contractors. Chutes might not be provided at every floor level. Each Contractor shall be responsible for disposing of their own waste material, including transport between floor levels as required.
- .5 On site job site trailers will not be permitted.

1.7. CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work and parking required by Region. Region's parking requirements take precedence over Contractor's use of site. Parking will be as directed by the Region.
- .2 Provide and maintain adequate access to project site.

1.8. OFFICES

- .1 Provide marked and fully stocked first-aid case in a readily available location within the area of Work.

1.9. TEMPORARY FACILITIES

- .1 The Contractor and personnel may use the existing sanitary services where provided on the approval of the Region. The Contractor is responsible to clean and disinfect the entire washroom or any other services used.
- .2 Existing sanitary services are considered to be "unavailable" when only private facilities within suites or homes exist.

- .3 When existing facilities are unavailable, provide temporary toilet facilities where directed and maintain to Municipal Sanitary regulations; remove when Work is complete and restore area to original condition.

1.10. EQUIPMENT, TOOLS, AND MATERIAL STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof tool chests for storage of tools, equipment and materials within the areas of Work or in locations as directed by the Region.
- .2 Materials, equipment, and tools stored on site remain the responsibility of the Contractor.

1.11. PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during Construction period except as otherwise specifically directed by Consultant.
- .3 Provide measures for protection and diversion of traffic, including provision of watchpersons and flag persons, erection of barricades, placing of lights around and in front of equipment and Work, and erection and maintenance of adequate warning, danger, and direction signs.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by Construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of Construction and hauling roads: subject to approval by Consultant and Region.
- .12 Lighting: to assure full and clear visibility for full width of haul road and Work areas during night Work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of Work, haul roads designated by Consultant and Region.

1.12. CLEAN-UP

- .1 Remove Construction debris, waste materials, packaging material from Work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in Construction facilities.
- .5 Clean-up of the areas of Work shall be cleaned by the Contractor's forces at the end of each shift and the debris removed from the site.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

1.2. INSTALLATION AND REMOVALS

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Isolate Work areas to protect residents and Workers from injury, private and public property from damage, by providing guards, rails, hoardings, braces, shoring, underpinning, temporary covers, covered passageways, ramps, warning signs, visual and audible signals.
- .3 Provide necessary protection without interfering with free, safe passage and maximum possible use of the premises by residents.
- .4 Replace, repair, or make good damage immediately at no additional cost to the Contract.
- .5 Ensure that no unauthorized personnel are allowed in the Work areas.
- .6 Remove from site all such Work after use.

1.3. HOARDING

- .1 Erect temporary site enclosure using new 1.8 m high hot dipped galvanized steel Construction fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide two lockable truck gates as indicated on drawings. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and Construction procedures.
- .3 Provide interim hoarding in existing garage as indicated on drawings. Hoarding to be dust tight and secure (full height plywood on adequate wood framing).

1.4. GUARD RAILS AND BARRICADES

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

1.5. WEATHER ENCLOSURES

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

1.6. DUST TIGHT SCREENS

- .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such Work is complete.

1.7. ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and Construction runways as may be required for access to Work.

1.8. PUBLIC TRAFFIC FLOW

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

1.9. FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles. Do not block Fire Routes in any manner.

1.10. 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.

1.11. PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Provide 6 mil polyethylene coverings to separate corridor where Work is to occur from the rest of the building. Tape polyethylene in place, preventing dusting or soiling of existing interior spaces. Provide additional protection to prevent other damage where required. This includes but is not limited to using plywood or OSB sheets to prevent impact damage.
- .4 Provide coverings to prevent damage to concrete slab surfaces.

- .5 Confirm with Consultant locations and installation schedule 3 days prior to installation.
- .6 Be responsible for damage incurred due to lack of or improper protection.

1.12. WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 - Construction/Demolition Waste Management and Disposal.
- .2 Debris shall not be allowed to free-fall from openings in the building's exterior walls. Provide garbage chutes in compliance with applicable legislation where debris from upper floors is dropped from the building. Existing windows may be removed and re-installed to suit this requirement, subject to maintaining weather and security protection.
- .3 The Region's waste receptacles shall not be utilized for Construction waste.
- .4 Waste and/or debris shall be removed from the areas of Work and off site at the end of each day.

1.13. TEMPORARY STORAGE

- .1 Storage facilities will not be provided unless arrangements have been made prior to the commencement of Work.
- .2 Provide suitable coverings for materials that are to remain safe and dry.
- .3 Deliver, store, and maintain packaged materials and equipment with manufacturer's seals and labels intact.
- .4 Prevent damage, adulteration, and soiling of material and equipment during delivery, handling, and storage. Immediately remove any rejected materials and equipment from site with no additional cost to the Region.
- .5 Store and maintain material and equipment in accordance with manufacturer's and supplier's instructions.
- .6 Do not load, or permit to be loaded, any part of the Work with a weight or a force that will endanger the Work.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Region or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Region or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time Work will be executed.

1.2. MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 – Submittal Procedures.

1.3. PREPARATION

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

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

1.4. EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry Work without prior approval.
- .10 Restore Work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 At penetration of fire rated wall, ceiling, or floor Construction, completely seal voids with fire-stopping material in accordance with Section 07 84 00 – Fire-stopping, full thickness of the Construction element.
- .13 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .14 Conceal pipes, ducts and wiring in floor, wall, and ceiling Construction of finished areas except where indicated otherwise.

1.5. EXECUTION OF WORK

- .1 The existing premises are occupied, and it is the responsibility of the Contractor to execute Work to cause minimum interference to residents and their personal effects.
- .2 Take reasonable measures to control noise during Work operations.

- .3 Execute Work with least possible interference or disturbance to occupants, public and normal use of premises, roadways, parking areas, sidewalks, alleys, or passageways. Arrange with Consultant to facilitate execution of Work. All egress doors providing access to Work areas to be controlled. This to be coordinated with the Region's Representative.
 - .4 Provide all protection necessary or as required by local by-laws including but not limited to hoarding, covered walkways, guard rails, barriers, night lights, sidewalk or curb protection and warning notices in locations where renovation and alteration Work is adjacent to areas used by building occupants or public.
 - .5 Take all necessary precautions to keep the dust, and dirt to an acceptable level as directed by Region's Representative and Consultant. The Contractor shall also comply with the laws, ordinances, rules, and regulations relating to the Work in connection with the above.
 - .6 Where Work is performed adjacent to air intakes, Region's Representative and Consultant must be notified so that appropriate measures can be taken.
 - .7 Protect exterior surfaces of the building and grounds from debris and damage.
 - .8 Protect adjacent property and building against damage which may occur as a result of the Work. Make good, to the satisfaction of the Region's Representative and Consultant, and damage resulting from the Work of this Contract at no additional cost to the contract.
- 1.6. WASTE MANAGEMENT AND DISPOSAL
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 – Construction Waste Management.

PART 2 - PRODUCTS

- 2.1. NOT APPLICABLE

PART 3 - EXECUTION

- 3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions.

1.2. PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Region. Do not burn waste materials on site, unless approved by Region.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site individual containers for collection and sorting of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 20 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finishing Work and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
- .13 Clean-up shall be performed at the end of each shift by the Contractor's forces and the debris removed from the site. The Contractor shall not rely on the client's cleaning service providers for any Construction related clean-up. Should the Client's forces provide cleaning services of Construction related dirt and/or debris the costs for same shall be back charged to the Contractor.

1.3. FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, Construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, Construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Region or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Region. Do not burn waste materials on site, unless approved by Region.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched, or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative Work, electrical and mechanical fixtures, furniture fitments, walls, floors, and ceilings.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres, and screens.
- .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .13 Broom clean and wash exterior walks, steps, and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .16 Sweep and wash clean paved areas.
- .17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .18 Clean roofs, downspouts, and drainage systems.
- .19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .20 Remove snow and ice from access to building.

1.4. WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Ontario Ministry of the Environment.

1.2. DEFINITIONS

- .1 Class III: non-hazardous waste - Construction renovation and demolition waste.
- .2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW and intended as financial tracking tool for determining economic status of waste management practices.
- .3 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .4 Inert Fill: inert waste - exclusively asphalt and concrete.
- .5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .8 Recycling: process of sorting, cleansing, treating, and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .10 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .11 Returning reusable items including pallets or unused products to vendors.
 - .12 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
 - .13 Separate Condition: refers to waste sorted into individual types.
 - .14 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
 - .15 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during Construction,

demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling, and landfill. Refer to Schedule A.

- .16 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .17 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.3. ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4. MATERIALS SOURCE SEPARATION PROGRAM

- .1 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .2 Provide containers to deposit reusable and recyclable materials.
- .3 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .4 Locate separated material[s] in area[s] which minimize material damage.
- .5 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
 - .1 Transport to approved and authorized recycling facility.
- .6 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.
 - .1 Ship material[s] to site operating under Certificate of Approval.
 - .2 Materials must be immediately separated into required categories for reuse or recycling.

1.5. STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled, and salvaged in locations as directed by Region.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property.
- .3 Protect, stockpile, store, and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations, and immediately notify Consultant.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

1.6. DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, and paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of Construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

1.7. USE OF SITE AND FACILITIES

- .1 Execute Work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures established by existing facility provide temporary security measures approved by Region.

1.8. SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. APPLICATION

- .1 Do Work in compliance with WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2. CLEANING

- .1 Remove tools and waste materials on completion of Work and leave Work area in clean and orderly condition.
- .2 Clean-up Work area as Work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.3. DIVERSION OF MATERIALS

- .1 Recycle and/or salvage non-hazardous Construction and demolition debris excluding land-clearing debris such as soil and rocks.
 - .1 Prevent contamination of materials for reuse and recycling by handling in accordance with requirements for acceptance by designated facilities.
 - .2 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Consultant, and consistent with applicable fire regulations.
 - .1 A project may choose to separate Construction waste on-site or have commingled Construction waste sorted at an off-site facility.
 - .1 On-site separation provides immediate feedback of the ongoing waste diversion efforts but may require additional labour.
 - .2 Commingled recycling simplifies the waste management effort on-site. This option is especially useful for projects with tight space constraints and no room for multiple collection bins.
- .3 Required Construction and demolition waste diversion:
 - .1 100% Diversion from Landfill:
 - .1 Concrete
 - .2 Asphalt
 - .3 Clean Rubble
 - .4 Cardboard

- .5 Standard gypsum board (unpainted)
- .6 Clean Lumber
- .7 Glass
- .8 All metals (aluminium, steel, iron, copper)

3.4. CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

- .1 Schedule E - Government Chief Responsibility for the Environment:

Ontario Ministry of the Environment

135 St. Clair Avenue West,

Toronto, Ontario M4V 1P5

Tel: 416-325-4000

Toll Free: 1-800-565-23

- .2 Environment Canada

4905 Dufferin Street,

Toronto, Ontario M3H 5T4

Tel: 416-739-4826

Fax: 416-739-4776

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions.

1.2. REVIEW AND TAKEOVER PROCEDURES

- .1 In accordance with CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions GC12.1.
- .2 Contractor shall arrange and pay for review by local authorities to obtain permission to occupy/occupancy permit (where applicable) prior to requesting Substantial Performance

1.3. ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Consultant's inspection.
 - .2 Consultant's Inspection:
 - .1 Consultant and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
- .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted, and balanced and fully operational.
 - .4 Certificates required by Fire Commissioner and Utility companies: submitted.
 - .5 Operation of systems: demonstrated to Region's personnel.
 - .6 Commissioning of mechanical and electrical systems: completed in accordance with Division 23, 26 and 28 and copies of final Commissioning Report submitted to Consultant.

- .7 Work: complete and ready for final inspection.
 - .8 On completion of Work and prior to final inspection, submit record documents to Consultant.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Consultant, and Contractor.
 - .2 When Work incomplete according to Region and Consultant, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Consultant considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Commencement of Lien and Warranty Periods: date of Region's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
 - .7 Final Payment:
 - .1 When Region and Consultant consider final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
 - .2 When Work deemed incomplete by Region and Consultant, complete outstanding items and request re-inspection.
 - .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual Agreement.
 - 1.4. FINAL CLEANING
 - .1 Clean in accordance with Section 01 74 00 - Cleaning. Remove surplus materials, excess materials, rubbish, tools, and equipment.
 - .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20 – Construction Waste Management.
- PART 2 - PRODUCTS
- 2.1. NOT APPLICABLE
- PART 3 - EXECUTION
- 3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions.

1.2. ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .2 Convene meeting one week prior to contract completion with contractor's representative and Consultant, in accordance with Section 01 31 00 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's installation instructions and warranty requirements.
 - .3 Consultant to establish communication procedures for:
 - .1 Notifying Construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .4 Contact information for bonded and licensed company for warranty Work action: provide name, telephone number and address of company authorized for Construction warranty Work action.
 - .5 Ensure contact is located within local service area of warranted Construction, is continuously available, and is responsive to inquiries for warranty Work action.

1.3. ACTION AND INFORMATION SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to release of the first certificate of payment as applicable, a draft copy of the O&M Documentation shall be submitted by the contractor and reviewed by the project team to ensure the format is acceptable to the Region.
- .3 Two weeks prior to Substantial Performance of the Work, submit to the Consultant, one (1) electronic copy of the O&M Documentation in PDF format. During the warranty, the contractor is responsible to update the O&M documentation to capture any changes made as applicable.
- .4 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .5 Provide evidence, if requested, for type, source and quality of products supplied.

1.4. FORMAT

- .1 Organize data as an instructional manual. Manual to be submitted in electronic PDF format on a USB 'thumb' drive.
- .2 Arrange content by systems, process flow, under Section numbers and sequence of Table of Contents.
- .3 Provide a directory structure with sub-directories as required with descriptive files names.
- .4 Drawings: Provide scaled AutoCAD files in 'dwg' format and PDF format on USB 'thumb' drive.

1.5. CONTENTS – PROJECT RECORD DOCUMENTS

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

1.6. AS-BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Region and Consultant one (1) record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.

- .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
 - .2 Store record documents and samples in field office apart from documents used for Construction.
 - .1 Provide files, racks, and secure storage.
 - .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
 - .4 Maintain record documents in clean, dry, and legible condition.
 - .1 Do not use record documents for Construction purposes.
 - .5 Keep record documents and samples available for inspection by Consultant.
- 1.7. RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS
- .1 Record information on set of black line opaque drawings, provided by Consultant.
 - .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
 - .3 Record information concurrently with Construction progress.
 - .1 Do not conceal Work until required information is recorded.
 - .4 Contract Drawings and shop drawings: mark each item to record actual Construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances referenced to visible and accessible features of Construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
 - .5 Specifications: mark each item to record actual Construction, including:

- .1 Manufacturer, trade name, and catalogue number of each product actually installed particularly optional items and substitute items.
- .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual Specifications sections.
- .7 Construction photos, commissioning forms, training materials (including videos) shall be included in the Operation & Maintenance Manual(s).

1.8. EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shutdown, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports.
- .15 Additional requirements: as specified in individual Specification sections.

1.9. MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual Specifications sections.

1.10. MAINTENANCE MATERIALS

- .1 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 Deliver to site, place, and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Consultant.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock 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 Deliver to site location as directed, place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Consultant.

- .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
 - .3 Special Tools:
 - .1 Provide special tools, in quantities specified in individual Specification section.
 - .2 Provide items with tags identifying their associated function and equipment.
 - .3 Deliver to site location as directed, place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Consultant.
 - .2 Include approved listings in Maintenance Manual
- 1.11. DELIVERY, STORAGE AND HANDLING
- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
 - .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
 - .3 Store components subject to damage from weather in weatherproof enclosures.
 - .4 Store paints and freezable materials in a heated and ventilated room.
 - .5 Remove and replace damaged products at own expense and for review by Consultant.
- 1.12. WARRANTIES AND BONDS
- .1 Submit, warranty information made available during Construction phase, to Consultant for approval prior to each monthly pay estimate.
 - .2 Assemble approved information in binder, submit upon acceptance of Work and organize binder as follows:
 - .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 principals.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of Work.
 - .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 submittal.
- .7 Guarantees, Warranties and Bonds are to show name and address of project, commencement date and duration. Clear indication of what is being guaranteed or warranted is to appear on the certificate, including what remedial action will be taken under if item / system should fail. The Contractors signature and seal is to be included.
- .3 Except for items put into use with Region's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .4 Conduct joint nine (9) month warranty inspection, measured from time of acceptance, by Consultant.
- .5 Respond in timely manner to oral or written notification of required Construction warranty repair Work.
- .6 Written verification to follow oral instructions.
- .1 Failure to respond will be cause for the Region and Consultant to proceed with action against Contractor.

1.13. WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water-resistant tag approved by Consultant.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. ADMINSTRATIVE REQUIREMENTS

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to Region's personnel two weeks prior to date of final inspection.
- .2 Region: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed upon times.
- .3 Preparation:
 - .1 Verify conditions for demonstration and instructions comply with requirements.
 - .2 Verify designated personnel are present.
 - .3 Ensure equipment has been inspected and put into operation in accordance with applicable Sections.
 - .4 Ensure testing, adjusting, and balancing has been performed and equipment and systems are fully operational.
- .4 Demonstration and Instructions:
 - .1 Demonstrations and Instructions shall not take place until after the O&M manuals and as-built drawings have been reviewed and accepted by the Consultant.
 - .2 Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.
 - .3 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
 - .4 Review contents of manual in detail to explain aspects of operation and maintenance.
 - .5 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

1.2. ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two (2) weeks prior to designated dates, for Region's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

- .4 Give time and date of each demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.3. QUALITY ASSURANCE

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
 - .1 Instruct Region's personnel.
 - .2 Provide written report that demonstration and instructions have been completed.

PART 2 - PRODUCTS

2.1. NOT APPLICABLE

PART 3 - EXECUTION

3.1. NOT APPLICABLE

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 American National Standards Institute (ANSI):
 - .1 ANSI A10.8 2011, Scaffolding Safety Requirements
- .2 Canadian Standards Association (CSA):
 - .1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .3 National Fire Protection Association (NFPA):
 - .1 NFPA 241 09, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 Provincial Legislation:
 - .1 Legislation specific to Authority Having Jurisdiction for Work governed by this Section.

1.2. DEFINITIONS

- .1 Demolish: Detach items from existing Construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Remove and Salvage: Detach items from existing Construction and deliver them to Region ready for reuse.
- .3 Remove and Reinstall: Detach items from existing Construction, prepare them for reuse, and reinstall them where indicated.
- .4 Existing to Remain: Existing items of Construction that are not removed and that are not otherwise indicated as being removed, removed, and salvaged, or removed and reinstalled.

1.3. EXAMINATION

- .1 Visit and examine the site and note all characteristics and irregularities affecting Work of this Section. Submit a pre-demolition inspection report. Ensure the Region of premises being inspected is represented at inspection.
- .2 Where appropriate prepare a photographic or video record of existing conditions, particularly of existing Work scheduled to remain.
- .3 Where applicable, examine adjacent tenancies not part of the scope of Work. Determine extent of protection required to areas and related components not subject to demolition.

1.4. SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any Work of this Section:
 - .1 Prepare schedule in conjunction with overall project schedule and outline proposed methods in writing. Obtain approval before commencing demolition Work, and indicate the following:
 - .1 Detailed sequence of selective demolition and removal Work, with starting and ending dates for each activity
 - .2 Interruption of utility services
 - .3 Coordination for shutoff, capping, and continuation of utility services

1.5. QUALITY ASSURANCE

Conform to requirements of all authorities having jurisdiction.

Comply with applicable requirements of CSA S350-M "Code of Practice for Safety in Demolition of Structures".

Work of this Contract shall be executed by an approved company having a minimum of five (5) years continuous experience and able to deploy adequate equipment and skilled personnel to complete Work expediently in an efficient and orderly manner.

Perform cutting and coring, where applicable, by a firm specializing in this type of Work, able to produce evidence of successful completion of similar Work over a period of at least five (5) years immediately prior to date of contract.

Apply for, secure, arrange and pay for all permits, notices, and inspections necessary for proper execution and completion of Work in this Section.

Professional Engineer Qualifications: Procure the services of a professional engineer who is experienced in providing relevant engineering services to perform the following:

- .1 Review portions of the Work requiring structural performance, prepare plan of action, engineer temporary shoring and bracing, and Provide site administration and inspection for Work of this Section.

1.6. PROTECTION

- .1 Prevent movement or settlement of adjacent Work. Provide and place bracing or shoring and be responsible for safety and support of such Work. Be liable for any such movement or settlement, and any damage or injury caused.
- .2 Cease operations and notify Consultant if safety of any adjacent Work or structure appears to be endangered. Take all precautions to support the structure. Do not resume operations until reviewed with the Consultant.
- .3 Prevailing weather conditions and weather forecasts shall be considered. Demolition Work shall not proceed when weather conditions constitute a hazard to the workers and site.

- .4 Prevent damage of surrounding vegetation by Construction. Install tree protection barriers to trees that are to remain.
- .5 Prevent debris from blocking surface drainage inlets and mechanical and electrical systems which remain in operation.
- .6 Temporarily suspended Work that is without continuous supervision shall be closed to prevent entrance of unauthorized persons.

1.7. REMAINING AND ADJACENT STRUCTURES

- .1 Do not interfere with, encumber, endanger, or create nuisance, from any cause due to demolition Work, to public property or any adjacent attached and/or detached structures in possession of Region or others, which are to remain, whether occupied or unoccupied during this Work.
- .2 Make good damage to such structures resulting from Work under this Section at no cost to Region. Make good adjacent building surfaces damaged by Work of this Section.

1.8. PROTECTION OF SERVICES AND STRUCTURES

- .1 Take necessary precautions to guard against movement, settlement or collapse of existing adjacent utility services, public property and/or structures, whether to remain or not. If these or other unforeseen conditions develop, take immediate emergency measures, report to Consultant, confirm in writing, and await instructions before proceeding with any further related demolition Work.
- .2 Prior to saw cutting or core drilling of existing concrete slabs, use ground penetrating radar (GPR) to detect utilities and structural reinforcing. Concrete X-Rays can be used when access to both sides of concrete slab is accessible for placement of required x-ray film.

1.9. EXISTING WARRANTIES

- .1 Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1. DEBRIS, SALVAGED MATERIAL AND EQUIPMENT DISPOSAL

- .1 All materials and or equipment salvaged from demolition Work becomes property of demolition Contractor unless designated otherwise.
- .2 At no cost to Region repair or replace material and/or equipment scheduled to remain which is damaged by demolition Work. Do not sell any salvaged material or equipment directly from project site.
- .3 Remove waste debris continually and entirely from project site during demolition Work. Do not load vehicles transporting such debris beyond their safe capacity or in a manner

which might cause spillage on public or private property. If spillage does occur, clean up immediately to prevent traffic hazards or nuisance.

2.2. PROTECTION

- .1 Erect temporary hoarding protection, to enclose openings in exterior walls, and/or provide security to partially occupied interior spaces.
- .2 Erect temporary dust screens, to prevent dust and debris to enter areas of the building which are not scheduled for demolition. Remove temporary dust screens when no longer required.

2.3. REPAIR MATERIALS

- .1 Use repair materials identical to existing materials:
 - .1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - .2 Use a material whose installed performance equals or surpasses that of existing material.
 - .3 Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1. GENERAL

- .1 Exercise caution in dismantling, disconnecting of Work adjacent to existing Work designated to remain.
- .2 Carry out demolition in a manner to cause as little inconvenience to the adjacent properties as possible.
- .3 Carry out demolition in an orderly and careful manner.
- .4 Demolition by explosives is not permitted.
- .5 Selling or burning of materials on site is not permitted.
- .6 Sprinkle exterior debris with water to prevent dust. Do not cause flooding, contaminated run-off or icing. Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.
- .7 Lower waste materials in a controlled manner; do not drop or throw materials from heights.
- .8 At end of each day's Work, leave in safe condition so that no part is in danger of toppling or falling.

3.2. SAFETY AND SECURITY

- .1 Maintain security of the building at all times during demolition Work.
- .2 Provide and maintain fire prevention equipment and alarms accessible during demolition.

3.3. ACCESS ROUTES

- .1 Restrict operations to designated access routes.
- .2 Do not obstruct roads, parking lots, sidewalks, hydrants, and the like.

3.4. SELECTIVE DEMOLITION

- .1 Provide necessary shoring and supports to assure safety of structure prior to cutting and coring.
- .2 Where practical, sawcut and remove material as required.
- .3 Where saw cutting is not appropriate, use suitable hand tools.
- .4 Demolish, cut-out and remove from site all other Work noted on drawings or required to permit new Construction.
- .5 Do not allow water to accumulate or flow beyond Work area. Provide receptacles and mop-up as Work proceeds.
- .6 Fill all openings in concrete block walls with concrete masonry units, coursing to match existing, prepare ready to receive new finishes to match existing.
 - .1 Provide bond beams in new openings cut into existing concrete masonry unit walls.
 - .2 Provide finished end masonry units to patch and repair for new jamb sections in existing concrete masonry unit walls.
- .7 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.
- .8 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.
- .9 Prepare existing surfaces schedule to receive new finish by grinding, filling, over-coating, stripping, washing, etching, shot blasting or other chemical or mechanical means, as required to ensure satisfactory installation of new finish.

3.5. PATCHING AND REPAIRING

- .1 Floors and Walls:
 - .1 Provide a level and smooth surface having uniform finish colour, texture, and appearance.

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- .2 Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - .3 Patch any existing areas adjoining / adjacent to new Construction in good workmanship, filling and finishing gaps between finishes to allow new Work to blend seamlessly with existing Work.
 - .4 Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
- .2 Exterior Walls: Where existing doors and/or windows are schedule to be removed during demolition, patch and repair exterior walls using similar wall Construction techniques as adjacent wall Construction. Ensure compatibility between insulation, air barrier and vapour retarder, providing continuous air and vapour control and wall R-Value between existing and new Construction. Provide exterior and interior finish materials, matching existing adjacent materials, to provide an even plane surface of uniform appearance.

3.6. EXCESSIVE DEMOLITION

- .1 Where excessive demolition occurs, be responsible for cost of replacing such Work.
- .2 Consultant shall determine extent of such 'over-demolition' and method of rectification.

3.7. COMPLETION

- .1 Leave project site as directed, reasonably clean and presentable, free from above grade debris, any salvaged material and/or equipment except those designated to remain.
- .2 Maintain access to exits clean and free of obstruction during removal of debris.

END OF SECTION

PART 1 - GENERAL

1.1. REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 ULC-S115-1995, Fire Tests of Fire stop Systems.
 - .2 ULC Listing of Equipment and Materials.
 - .3 ULC Guide 40-U19 – Fire stop Systems.
 - .4 ULC Guide 40-U19.13 – Fire stop System Components.
 - .5 CAN-ULC S101M Standard Methods of Fire Endurance Tests of Building Construction Materials.
 - .6 CAN- ULC S102 Test Method for Surface Burning Characteristics of Building Materials.
 - .7 CAN-ULC S115-M Standard Method of Fire Tests of Fire stop Systems.

1.2. DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: OBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible Construction or have "0" annular space in buildings of combustible Construction.
 - .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.3. ACTION AND INFORMATIONAL SUBMITTALS

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

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- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, Specifications and datasheet and include product characteristics, performance criteria, physical size, finish, and limitations.
 - .2 Submit [two] copies of WHMIS MSDS - Material Safety Data Sheets.
 - .3 Shop Drawings:
 - .1 Submit shop drawings to show [location,] proposed material, reinforcement, anchorage, fastenings, and method of installation.
 - .2 Indicate the ULC system number, the required temperature and flame rating, thickness, installation methods and materials of fire stopping and smoke seals, damming materials.
 - .3 Construction details should accurately reflect actual job conditions.
 - .4 Samples:
 - .1 Submit three duplicate 300 x 300 mm samples showing actual fire stop and smoke seal material proposed for project.
 - .5 Close-Out Submittal
 - .1 In accordance with Section 01 78 00 – Closeout Submittals and in addition:
 - .1 Submit a set of architectural plans, prepared after receipt of Mechanical and Electrical record drawings, showing locations of all fire stop seals on each floor.
 - .2 Prepare and submit a corresponding typewritten listing, indicating penetration, sizing, location on plan and applicable ULC listing card number.
 - .6 Quality assurance submittals:
 - .1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
 - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with Specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

- .4 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.4. QUALITY ASSURANCE

.1 Qualifications:

- .1 Installer: company and person specializing in fire stopping installations with 5 years documented experience approved by manufacturer.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning Work of this Section, with contractor's representative and Consultant in accordance with Section 01 32 00 - Construction Progress Schedule - Bar (GANTT) Chart to:

- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with other building subtrades.
- .4 Review manufacturer's installation instructions and warranty requirements.

.3 Authorities having Jurisdiction:

- .1 Provide certificate of compliance from authority having jurisdiction indicating approval.
- .2 The contractor is expected to provide details as required by the documents as well as by the Municipal Building Inspector.
- .3 For those firestop applications that exist for which no ULC or cUL tested system is available through the manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation.

1.5. RELATIONSHIP TO OTHER TRADES

- .1 Sequence Work to permit fire stopping materials to be installed after adjacent and surrounding Work is completed, and before gypsum wallboard track, fireproofing, and mechanical pipe insulation are installed.

1.6. DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling, and unloading:
- .2 Deliver, store and handle materials.
- .3 Deliver, store and handle materials in accordance with manufacturer's written instructions.

- .4 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .5 Storage and Protection:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .6 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 20 - Construction Waste Management.

1.7. WARRANTY

- .1 Warranty Work of this section against defects and deficiencies for a period of 5 years in accordance with General Conditions of Contract. Promptly correct any defects or deficiencies which become apparent within warranty period to satisfaction of the Consultant at no additional costs to the Region.
- .2 Defects shall include but shall not be limited to cracking, breakdown of bond, failure to stay in place or bleeding.

PART 2 - PRODUCTS

2.1. GENERAL

- .1 Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturers based on testing and field experience.
- .2 Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- .3 Firestopping materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide "cast-in-place" firestop devices prior to concrete placement.
- .4 Fire resistance rating of installed fire stopping assembly shall be not less than the fire resistance rating of surrounding floor and wall assembly.
- .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal; do not use cementitious or rigid seal at such locations.
- .6 Fire stopping 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.
- .7 Fire stopping 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 its original configuration without damage to the seal and without adhesive or cohesive failure.

- .1 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.: fire stop mortar deck flute fill).

2.2. ACCEPTABLE MANUFACTURERS

- .1 Acceptable manufacturers: (not for all products, but where suited for specified performance)
- .2 Hilti (Specification based on Hilti products, however all listed manufacturers are acceptable).
 - .1 3M Canada.
 - .2 Tremco.
 - .3 Dow Corning.
 - .4 Fire Stop Systems.

2.3. MATERIALS

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated Construction conditions conforming to Construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- .2 Fire stopping and smoke seal systems: in accordance with CAN4 –S101 and CAN4 S115 to achieve the fire rating as noted in the schedule or on drawings, in accordance with ULC or Warnock Hersey Design Numbers.
 - .1 Asbestos free materials and systems capable of maintaining an effective barrier against flame, smoke, and gases in compliance with requirements of CAN4 S115 M85 and not to exceed opening sizes for which they are intended.
 - .2 Firestop system rating for service penetrations: to suit Ontario Building Code, 3.1.9.1 Firestopping of Service Penetrations.
 - .3 Firestop system rating for sealing junction of rated walls to rated floors and ceilings: to suit Ontario Building Code.
- .3 Service penetration assemblies: certified by ULC in accordance with CAN4 S115 M85 and listed in ULC Guide No. 40 U19.
- .4 Service penetration firestop components: certified by ULC in accordance with CAN4 S115 M85 and listed in ULC Guide No. 40 U19.13 and ULC Guide No. 40 U19.15 under the Label Service of ULC.

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- .5 Cast-in-place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:
 - .1 Hilti CP 680, Cast-in Place Firestop Device.
 - .2 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .6 Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit, and electrical metallic tubing (EMT), the following products are acceptable:
 - .1 Hilti FS-ONE, Intumescent Firestop Sealant.
 - .2 Hilti FS 604, Self-Levelling Firestop Sealant.
 - .3 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .7 Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
 - .1 Hilti CP-601s, Elastomeric Firestop Sealant.
 - .2 Hilti CP 606, Flexible Firestop Sealant.
 - .3 Hilti FS-ONE, Intumescent Firestop Sealant.
 - .4 Hilti FS 604, Self-Levelling Firestop Sealant.
 - .5 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .8 Sealants, caulking or spray materials for use with fire-rated Construction joints and other gaps, the following products are acceptable:
 - .1 Hilti CP-672, Firestop Spray.
 - .2 Hilti CP-601s, Elastomeric Firestop Sealant.
 - .3 Hilti CP 606, Flexible Firestop Sealant.
 - .4 Hilti FS 604, Self-Levelling Firestop Sealant.
 - .5 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .9 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
 - .1 Hilti FS-ONE, Intumescent Firestop Sealant.
 - .2 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .10 Intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:

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- .1 Hilti FS-ONE, Intumescent Firestop Sealant.
 - .2 Hilti CP 618, Firestop Putty Stick.
 - .3 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .11 Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
 - .1 Hilti CP 618, Firestop Putty Stick.
 - .2 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .12 Wall opening protective materials for use with ULC listed metallic and specified non-metallic outlet boxes, the following products are acceptable:
 - .1 Hilti CP 617, Firestop Putty Pad.
 - .2 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .13 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - .1 Hilti CP 642, Firestop Collar.
 - .2 Hilti CP 643 Firestop Collar.
 - .3 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .14 Materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:
 - .1 Hilti FS 635, Trowelable Firestop Compound.
 - .2 Hilti FS 657, FIRE BLOCK.
 - .3 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .15 Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:
 - .1 Hilti FS 657, FIRE BLOCK.
 - .2 Equivalent products listed in the current ULC Fire Resistance Directory.
 - .16 Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
 - .1 Hilti CP-672, Firestop Spray.
 - .2 Hilti CP-601s, Elastomeric Firestop Sealant.

- .3 Hilti CP 606, Flexible Firestop Sealant.
 - .4 Hilti FS 604, Self-Levelling Firestop Sealant.
 - .5 Equivalent products listed in the current ULC Fire Resistance Directory.
- .17 For non-combustible pipes, tubing, ducts, chimneys, optical fibre cables, electrical wires, and cables, totally enclosed non-combustible raceways, electrical outlet boxes and similar building services that penetrate through a fire separation provide a firestop system with a "F" Rating as determined by ULC or cUL as indicated below:

Fire Resistance Rating of Separation	Required ULC or cUL 'F' Rating Of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

- .18 For combustible pipe penetrations through a Fire Separation provide a firestop system with a "F" Rating as determined by ULC or cUL (when tested with a pressure differential of 50Pa between the exposed and unexposed sides) which is equal to the fire resistance rating of the Construction being penetrated.
- .19 For penetrations through a Fire Wall or through horizontal Fire Separation between a storage garage and the major occupancy area provide a firestop system with a "FT" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the Construction being penetrated.
- .20 For joints provide a firestop system with an Assembly Rating as determined by CAN4-S115-M, ULCS115-M, or UL 2079 which is equal to the fire resistance rating of the Construction being penetrated.
- .21 Colour: if range available to Consultant's choice of standard colours, generally to match background colour where visible in finished spaces. i.e.: For unfinished concrete use grey colour.

2.4. ACCESSORIES

- .1 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .2 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

- .3 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .4 Sealants and putty for vertical and overhead joints: Non-sagging.
- .5 Sealants and fluid seals at floors: Self-levelling.
- .6 Tape: Pressure sensitive masking tape as recommended by the manufacturer of the Fire Stop.

PART 3 - EXECUTION

3.1. MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or Specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2. PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
 - .1 Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Do not apply fire stopping and smoke seals to substrates and surfaces previously painted or treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Remove insulation from insulating pipe and duct where such pipes or ducts penetrate a fire separation unless ULC certified assembly permits insulation to remain within the assembly. Ensure the continuity and integrity of thermal and vapour barriers where such are removed or altered, to the approval of the consultant.
- .5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3. COORIDNATION

- .1 Coordinate location and proper selection of cast-in-place Firestop Devices with trades responsible for the Work. Ensure device is installed before placement of concrete.
- .2 Responsible trade is to provide adequate spacing of field run pipes to allow for installation of cast-in-place Firestop devices without interference.

3.4. INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions and tested designs to provide the required temperature and flame rated seal, and to prevent the passage of smoke and liquids.
- .2 Completely fill and seal voids with fire stopping and smoke seal materials.
- .3 Seal holes or voids made by through penetrations, poke through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .4 Install fire stop before pipe insulation installation has commenced.
- .5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .6 Tool or trowel exposed surfaces to a neat finish.
- .7 Remove excess compound promptly as Work progresses and upon completion.
- .8 Allow materials to cure. Do not cover up materials until curing has taken place.
- .9 Dam material to remain if flame spread is below 25, in accordance with CAN4-S102 or ASTM-E84.
- .10 Fire damper perimeters: Apply a 6mm to 10mm bead of service penetration fire stop sealant at interface of retaining angles around fire dampers where retaining angles meet fire rated walls, floors, ceilings, or membranes thereof as well as at the interface of retaining angles and duct or fire damper. Provide two sealant beads per side, four beads per damper at wall dampers. Seal top side only at floor dampers.
- .11 Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of firestop systems that might hamper the performance of the fire dampers as it pertains to ductwork.
- .12 Protect materials from damage on surfaces subject to traffic.

3.5. SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by Consultant.
- .2 Install floor fire stopping before interior partition erections.
- .3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Mechanical pipe insulation: certified fire stop system component.
- .5 Ensure pipe insulation installation precedes fire stopping.

3.6. FIELD QUALITY CONTROL

- .1 Inspections: notify Consultant when ready for review and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

- .2 Keep areas of Work accessible until inspection by applicable code authorities.
- .3 Perform a series of five fog tests to random locations as designated by Consultant. Should penetration, joint or void, under the jurisdiction of this Section, emit visible fog, repair, and replace deficiencies and re-perform fog test at no additional cost to the Region.
- .4 Fog units to have a formulation output range of 6.8 L/h. Formulation particle size 1.5-25 microns. Fogging agent to be Wormald Fire Systems fog fluid, non-toxic, non-staining and shall provide a heavy fog at 30ppm with a permissible airborne level concentration of 50ppm. Fog at a rate of 4s/2.8m³. Maintain the fog density until inspection is complete.
- .5 Warning tags must be installed on each mechanical and electrical seal, either on penetrant(s), or next to seal, at subcontractors' option. Wall seals require tags on each side. Tag floor seals on the bottom only. Tags need not exceed 75 sq. mm in size but shall indicate the firestop system used (ULC or cUL), F rating or FT rating, firestop products used, installation date, installer's initial and the following sentence:

"FIRE STOP SYSTEM NOT TO BE SEVERED UNLESS PREPARED TO REPAIR IMMEDIATELY."
- .6 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting, and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.7. CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.8. SCHEDULE

- .1 Refer to attached details for Fire stop and Smoke seal at:
 - .1 Multiple Insulated/non-Insulated Metal Pipes Through Concrete Floor/Wall or Block Wall.
 - .2 Insulated Metal Pipe through Concrete floor/wall or Block wall.

- .3 Fire-rated joint through concrete wall assembly.
- .4 Plastic pipe through concrete floor/wall or block wall.
- .5 Flexible pipe penetration through wall or floor assembly.
- .6 Metal pipe through concrete floor/wall or block wall.
- .7 Multiple penetrations through all or floor assembly.
- .8 For rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 These Specifications are an integral part of the Contract Documents. Tendering and Contract Requirements, General Requirements apply to all Division 20 Specification Sections.
- .2 Work in the Specifications is divided into descriptive Sections which are not intended to delegate functions or Work to any specific Subcontractor or identify absolute contractual limits between Subcontractor, nor between the Contractor and their Subcontractor. The requirements of any one Section apply to all other Sections, for example: the motor service factor requirement. Refer to other Divisions and Sections to ensure a completed operational product and fully coordinated standard of Work.
- .3 The direction to 'provide' equipment, materials, products, labour, and services shall be interpreted to 'supply, install and test' the Division 20 Work indicated on the Drawings and specified in the Specifications.
- .4 Provide and include in the Contract Price Division 20 Work including mechanical components and normal system accessories not shown on the Drawings or stipulated in the Specifications and required to ensure completed operational systems and a fully coordinated standard of Work acceptable to the Consultant and all authorities having jurisdiction.

1.2. INTENT /PHASING

- .1 Mention in the Specifications or the indication on the Drawings of equipment, materials, operation, and methods, requires provision of the quality noted, the quantity required, and the systems complete in every respect.
- .2 Consider the Specifications as an integral part of the accompanying Drawings. Any item or subject omitted from one or the other, but which is either mentioned or reasonably implied, shall be considered as properly and sufficiently specified.
- .3 Where there is apparent contradiction or ambiguity in the documents, or where there are apparent discrepancies in or omissions from the documents, or if there is any doubt as to the intent of the documents, the bidder shall request and obtain written clarification(s) from the Consultant prior to submitting a tender. Consideration will not be granted for misunderstanding of the intent of the documents or the extent of the Work to be performed.
- .4 Be completely responsible for the acceptable condition and operation of all systems, equipment and components forming part of the installation or directly associated with it. Promptly replace defective materials, equipment and parts of equipment and repair related damages.
- .5 Phasing shall be scheduled with the Region.

1.3. METRIC PRACTICE

- .1 Conform to Canadian Metric Practice Guide CSA CAN3-Z234.1-89.
- .2 Provide adapters between metric and imperial installations.
- .3 Metric descriptions in this Division are nominal equivalents of Imperial values.

1.4. COORDINATION

- .1 Coordinate and schedule Division 20 Work with all other Work in the same area or with Work which is dependent upon Division 20 Work so as to facilitate mutual progress.
- .2 Identify and resolve interference problems prior to prefabrication and installation of equipment. Submit interference drawings for review upon Consultant Request.
- .3 Examine the site and all Contract Documents prior to bid submission. No allowance will be made for any difficulties encountered due to any features of the building, methods of Construction, site or surrounding public and private property which existed up to the bid close.

1.5. REFERENCE STANDARDS

- .1 Provide new materials and equipment of proven design and quality. Provide current models of equipment manufactured in Canada or the United States, unless specified otherwise, with published ratings certified by recognized North American testing and standards agencies.
- .2 Workmanship and installation methods shall conform to the best modern practice. Employ skilled tradesmen to perform Work under the direct supervision of fully qualified personnel.
- .3 Install equipment in strict accordance with manufacturers written recommendations.
- .4 Meet ASHRAE and other industry standards in the selection and provision of equipment, materials, pipe and duct components and systems.
- .5 Meet ASHRAE/IES 90.1, for the supply and installation of all equipment.
- .6 Meet the additional selection, sizing and performance criteria specified in this Specification.

1.6. DRAWINGS AND MEASUREMENTS

- .1 Drawings show general design and arrangement of mechanical system installation and are diagrammatic. Obtain further clarification of Drawings or Specifications from Consultant prior to installation.
- .2 Drawings do not indicate exact Architectural, Structural or Electrical features. Examine Drawings prior to laying out.
- .3 Do not scale Drawings to order materials. Take field measurements before ordering and fabricating materials.

- .4 Clarify 'roughing-in' requirements of equipment which is not part of Division 20 Work before proceeding.
- .5 Leave areas clear where space is indicated as reserved for future equipment and where space is required to maintain equipment. Maintenance clearances in addition to providing for servicing of equipment, shall allow for removal and reinstallation of replaceable items such as motors, coils, and filters.

1.7. REGULATORY REQUIREMENTS

- .1 Meet the requirements of Division 01.
- .2 Meet the requirements and recommendations of all Municipal, Provincial and Federal Bylaws and Ordinances.
- .3 Do not reduce the quality of Work specified and/or shown on the Drawings because of regulatory requirements.
- .4 In general, and as applicable, the physical and chemical properties, the characteristics and the performance of Division 20 Work shall meet the requirements of recognized agencies including those listed herein:
 - .1 AMCA - Air Moving & Conditioning Association
 - .2 ADC - Air Diffusion Council
 - .3 ANSI - American National Standards Institute
 - .4 ARI - Air Conditioning & Refrigeration Institute
 - .5 ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
 - .6 ASME - American Society of Mechanical Engineers
 - .7 ASTM - American Society for Testing and Materials
 - .8 AWWA - American Water Works Association
 - .9 CGA - Canadian Gas Association
 - .10 CGC - Consumers Gas Company
 - .11 CGSB - Canadian General Standards Board
 - .12 CIRI - Canadian Industrial Risk Insurers
 - .13 CSA - Canadian Standards Association
 - .14 CTI - Cooling Tower Institute
 - .15 FCC - Federal Communication Commission
 - .16 FM - Factory Mutual

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- .17 IAO - Insurers Advisory Organization
 - .18 MMC - Marsh McLennan Insurance Protection Consultants
 - .19 MTC - Ministry of Transportation and Communication
 - .20 NBCC - National Building Code of Canada
 - .21 NFPA - National Fire Protection Association
 - .22 OBC - Provincial Ontario Building Code
 - .23 OFM - Local Fire Codes or Standards Ontario Fire Marshall
 - .24 OH - Ontario Hydro Special Inspection Department
 - .25 OME - Ontario Ministry of Environment
 - .26 OML - Ministry of Labour and Workmen's Compensation
Requirements
 - .27 OWRA - Ontario Plumbing Code
 - .28 TBD - Local Building Codes City of Toronto, Buildings
Department
 - .29 UL - Underwriter's Laboratories Inc.
 - .30 ULC - Underwriter's Laboratories of Canada
- .5 Give all necessary notices, obtain all permits, and pay for all governmental fees, taxes, and other costs in connection with the Work. File all necessary Contract Documents, prepare submissions, and obtain approvals of regulatory bodies having jurisdiction.
 - .6 Comply with the requirements of the Model National Energy Code for Buildings in the selection, application and installation of all mechanical equipment and systems.
- 1.8. CHANGES TO CONTRACT WORK
- .1 Do not proceed with any changes to the Work without written authority from the Region.
 - .2 Follow procedures outlined in Tendering and Contract Requirements for administration and execution of Contract revisions.
 - .3 Quotations for changes to Division 20 Work shall be based on the actual cost of the Work:
 - .1 For Equipment - The latest edition of the Allpriser, including all applicable discounts or actual invoices where costs are not published.
 - .2 For Labour Rates –
 - .1 The Mechanical Contractors of America (MCA) published rates, Latest Edition, and as modified by negotiations.

- .2 SMACNA.
- .3 National Electrical Contractors Estimating Manual.
- .4 Markup for overhead and profit as defined in the Contract General Conditions.
- .5 Where changes are extensive, or where requested by the Consultant, material and labour take-off shall be organized on a drawing-by-drawing basis, or area by area basis to more readily facilitate verification of quantities and labour hours.

1.9. WARRANTY

- .1 Meet the requirements of Tendering and Contract Requirements.
- .2 Unconditionally warrant all equipment, material, and workmanship for not less than one year from date of Substantial Performance of the Work, or for longer periods when stated elsewhere in the Specifications.
- .3 If any equipment or material does not match the manufacturer's published data or specially supplied rating schedules during performance tests, replace without delay the defective equipment or material. Bear all associated costs of replacement without charge to the Region. Adjust all components to achieve the proper ratings.
- .4 The Region will give notice of observed defects promptly in writing.
- .5 Promptly correct defects and deficiencies which originate during the warranty period. Pay for resulting damage.

PART 2 - PRODUCTS

2.1. SHOP DRAWINGS

- .1 Meet the requirements of Division 01. Submit one (1) electronic copy in PDF format for Consultant review. One (1) electronic copy in PDF format will be returned to the Contractor bearing comments. Include all costs for reproduction of sufficient copies of reviewed shop drawings for manuals, site forces and coordination among other trades.
- .2 Identify Shop Drawing by Specification index reference and project name.
- .3 Review all Shop Drawings prior to submittal and clearly certify as 'Correct for Review by Consultant'. Show company name, date, and sign all Shop Drawings.
- .4 Consultant review of Shop Drawings does not relieve the Contractor of full responsibility for errors, necessity to check Shop Drawings, furnish materials and equipment and perform Work required by the Contract Documents.
- .5 Clearly identify all components, accessories, including options to be supplied with each item.
- .6 Submitted product data shall include sufficient detail to allow a reasonable assessment of the equipment being provided. The data shall include, but not be limited to:
 - .1 dimensions, including service clearance requirements.

- .2 design and working pressure ratings of pressure vessels and line components.
 - .3 shipping and operating weight including accessories and working fluids, together with point loadings.
 - .4 performance Specifications including pump and fan curves/charts.
 - .5 part load operational capabilities and limitations.
 - .6 sound power levels.
 - .7 materials of Construction including exterior and internal finishes
 - .8 factory test standards rating conformance to recognized and applicable industry standards.
 - .9 extended warranty coverage
 - .10 electrical requirements, including complete wiring diagrams clearly defining field, internal and factory wiring scope.
 - .11 motor, power, or control wiring requirements including rated voltage, phase, and cycle, rated power draw, full load current, motor size and speed, motor frame size, type of enclosure and maximum rated temperature rise.
 - .12 product installation, start-up, and operation manuals
 - .13 statement of compliance with the Model National Energy Code of Canada, as applicable.
- .7 Incomplete submissions will be returned as unacceptable.
 - .8 Bind one set of reviewed Shop Drawings in each Operating and Maintenance Manual.
 - .9 Provide shop drawings for specified items as follows:

Section	Title	Equipment
20 05 00	Basic Mechanical Materials and Methods	Expansion Joints & Guides Anchors Hangers
23 05 48	Sound and Vibration Controls	Vibration Isolators
20 07 00	Insulation	Insulation Materials Spec Sheets
23 75 33	Indirect Fired Makeup Air Units	Makeup Air Units
23 31 00	Sheet Metal	Access Doors Fire Dampers Smoke Dampers Backdraft Dampers Exhaust Fans

Section	Title	Equipment
		Exhaust Hoods Fire Rated Enclosures Pitot Test Ports
23 05 93	Balancing	Air Balancing Reports

2.2. ALTERNATIVE MANUFACTURER AND SUPPLIER

- .1 Equipment and materials are specifically described for the purpose of indicating standards of quality and workmanship. Base Bid on the items specified and shown on Drawings.
- .2 Alternatives for equipment or materials considered equal in quality and performance may be submitted before the end of the question deadline. Supply with each alternative, following bid submission, upon request by Consultant, the following information:
 - .1 details of manufacture
 - .2 dimensions including required clearance.
 - .3 performance data
 - .4 the cost saving for piping, ductwork and electrical changes imposed by the alternative.
 - .5 the effect upon and estimated cost to other trades
- .3 Where alternatives are accepted, there will be no further cost allowances for subsequent changes in Division 20 Work or other Contracts to make the alternative complete and equal to the specified equipment and materials.
- .4 If alternative equipment, differing from that which is shown on Drawings is accepted, prepare when requested, equipment layouts at no extra cost. Show clearly in plan, elevations and sections, all equipment details including dimensional changes. Show location changes to ducts, pipes and wiring and the effect of these changes on the building. Drawings shall be {1:50} [1/4"=1'0"] scale.
- .5 The right is reserved to accept or reject any alternative.

2.3. RECORD DRAWINGS

- .1 Meet the requirements of Division 01.
- .2 Suitably store and protect drawings on site and make available at all times for inspection.
- .3 Record inverts of underground piping at building entry/exit and below floor slab at each branch, riser base, change in direction as well as at least three points on straight runs.

- .4 Show locations of access doors and panels and identify the equipment and components that they serve.

2.4. OPERATING AND MAINTENANCE MANUALS

- .1 Meet the requirements of Division 01.
- .2 Submit one copy for review at least two weeks before instructions to Region are commenced.
- .3 Submit two copies of final manuals to the consultant.
- .4 Submit one hard copy and one electronic copy of final manuals to the Region.
- .5 Ensure that the terminology used in various sections of the manual is consistent.
- .6 Each manual shall contain the following information:
 - .1 description of each system with description of each major component of system
 - .2 complete sets of page size equipment Shop Drawings
 - .3 equipment manufacturer's installation, start-up, and operation manuals
 - .4 equipment manufacturer's recommended spare parts lists
 - .5 equipment wiring diagrams.
 - .6 lubrication schedule for all equipment
 - .7 equipment identification list with serial numbers
 - .8 page size valve tag schedule and flow diagrams.
 - .9 final balancing reports
 - .10 water treatment procedure and tests
 - .11 control drawings, sequences of operation.
 - .12 extended warranty documentation if applicable.

PART 3 - EXECUTION

3.1. INSPECTION, TESTING AND CERTIFICATES

- .1 Periodic inspections of the Work in progress will be made to check general conformity of the Work to the Contract Documents. Observed deficiencies will be reported. Correct deficiencies immediately.
- .2 Meet the requirements of all laws, bylaws, codes, regulations, and authorities having jurisdiction.

- .3 Where the Contract Documents, instructions or the governing authorities require Division 20 Work to be tested, inspected, or approved, give sufficient notice of its readiness for inspection, and schedule the date and time for such inspection.
- .4 Uncover Division 20 Work that is covered up without consent, upon Consultant request, for examination and restore at no extra cost to the Region.
- .5 Furnish certificates and evidence that Division 20 Work meets the requirements of authorities having jurisdiction.
- .6 Correct deficiencies immediately upon notification.

3.2. TEMPORARY SERVICES

- .1 Provide temporary mechanical services in accordance with the requirements of Division 01.
- .2 Make connections to temporary power source provided and provide extensions for use by Division 20.
- .3 Install and maintain temporary fire protection services as required by the authorities having jurisdiction.
- .4 When the permanent water service is installed, it shall be used to supply water for the use of Other Contractors.
- .5 Perform operations necessary for checking, testing, and balancing after written approval is given to start up systems. Ensure that care is taken to protect equipment from damage and to prevent distribution of dust through duct systems.
- .6 Do not use permanent plumbing, heating, or air conditioning systems for temporary services during Construction, except with written permission from Consultant.

3.3. CUTTING AND PATCHING

- .1 Meet the requirements of Division 01.
- .2 Give notification in time to Other Contractors of openings required for Division 20 Work. Supply accurate details of location and size. When this requirement is not met, bear the cost of cutting and patching.
- .3 In existing Work, cutting, patching and restoration of finished Work to original condition will be carried out by Other Contractors at the expense of Division 20.
- .4 Obtain written Consultant approval before cutting openings through structure.
- .5 Where new Work connects with existing and where existing Work is altered, cut, patch, and restore to match existing Work.

3.4. PROTECTION

- .1 Protect all Division 20 Work from damage. Keep all equipment dry and clean at all times.

- .2 Cover openings in equipment, pipes, and ducts, with caps or heavy gauge plastic sheeting until final connections are made.
- .3 Repair any damage caused by improper storage, handling or installation of equipment and materials.
- .4 Protect equipment, pipes and temporary services installed by Divisions 22, and 23 from weather damage.

3.5. TEMPORARY AND TRIAL USE

- .1 Obtain written permission from Consultant to use and test permanent equipment and systems prior to Substantial Performance acceptance by Consultant.
- .2 Consultant may use equipment and systems for test purposes prior to acceptance. Provide labour, fuel, material, and instruments required for testing. Rectify incomplete Work immediately to satisfaction of Consultant.
- .3 Protect equipment and system openings from dirt, dust, and other foreign materials during temporary usage. Whenever air handling systems are used for temporary services, in addition to other requirements specified, provide minimum {12 mm} [1/2"] thick glass fibre filter media in return air openings, transfer openings and other identified openings.
- .4 Clean and renew equipment and systems used prior to acceptance.
- .5 Warranty, including duration and commencement date, shall not to be affected by start-up date of equipment.

3.6. COMPLETION

- .1 Meet the requirements of Division 01.
- .2 Remove all debris from inside Division 20 systems and equipment.
- .3 Rectify deficiencies and complete Work before submitting request for Substantial Performance inspection.
- .4 Follow manufacturer's written instructions regarding bearing lubrication. Remove grease from pillow block type bearings and install new grease before equipment is put into operation.
- .5 Check and align all drives to manufacturer's acceptable tolerances.
- .6 Adjust belts for proper tension.
- .7 Check and align all pumps to manufacturer's acceptable tolerances.
- .8 Remove all temporary protection and covers.
- .9 Remove oil and grease from equipment and bases.
- .10 Clean all fixtures and equipment. Polish all plated surfaces.

- .11 Vacuum clean the inside of all air handling systems, including fans, ducts, coils, and terminal units to ensure that they are free from debris and dust.
- .12 Change air and water filters.
- .13 Remove, clean, and reinstall pipeline strainer screens.
- .14 Leave Division 20 Work in as new working order.

3.7. INSTRUCTIONS TO REGION

- .1 Meet the requirements of Division 01.
- .2 Submit to Region, check lists for each system or piece of equipment, indicating that all components have been checked and are complete prior to instruction period.
- .3 Thoroughly instruct the Region in the safe and efficient operation of the systems and equipment.
- .4 Arrange and pay for the services of qualified manufacturer's representatives to instruct Region on specialized portions of the installation, such as refrigeration machines, boilers, automatic controls, and water treatment.
- .5 Submit a complete record of instructions given to the Region. For each instruction period, supply the following data:
 - .1 Date
 - .2 Duration
 - .3 system or equipment involved.
 - .4 names of persons giving instructions
 - .5 names of persons being instructed.
 - .6 other persons present.
- .6 Submit receipted verification of completed training to Consultant prior to final release of retentions.
- .7 Carry out instructional period during a period of 5 days scheduled at Region's convenience.

3.8. INTERRUPTION OF EXISTING SERVICES

- .1 Arrange, schedule, and perform Work with minimum disturbance to existing facilities and services.
- .2 Submit a complete schedule of service interruptions and changeovers with approximate dates required, durations and times of day, for approval before proceeding.

- .3 Notify Region in writing at least 72 hours in advance of planned interruption to existing services.
- .4 Interruption of services must occur at the times and for the duration stipulated by the Region.
- .5 Keep service interruption duration to an absolute minimum. Carry out all preparatory Work, measurements, prefabrication, etc., without interruption of existing services.
- .6 If service interruptions are required by the Region during the night or on weekends, etc., premium time shall be included in the Contract Price. No extra charges will be allowed at a later date for failure to include same.

3.9. REMOVAL AND REUSE OF EXISTING MATERIALS

- .1 Carry out demolition Work in accordance with the Occupational Health and Safety Code.
- .2 Remove existing equipment, services and obstacles where required for refinishing or restoring existing surfaces. Replace same as Work progresses.
- .3 Present to the Region existing material and equipment removed but not identified for reuse on site. Acceptance of removed material and equipment is at discretion of Region. Remove such items from site when deemed unsuitable.
- .4 The Region will relocate equipment from existing facilities to the new building over a time period to be scheduled.
- .5 Where computer room air conditioning equipment is indicated to be existing, include for the disconnection and removal of this equipment from the location of existing equipment. Include for protection of the equipment per equipment manufacturer's recommendations, transport to the new building and position to locations shown on the Drawing.
- .6 Prepare new site for immediate conversion and connection of reused equipment. Carry out all preparatory Work, measurements, prefabrication, etc., without interruption of existing services. All Work to disconnect, remove, relocate, convert, connect, test and commission reused equipment shall be performed during a two-day weekend shutdown period. Include premium time in the Contract Price.
- .7 Execute Work with least possible interference or disturbance to Region and to other Work taking place over the same time period.
- .8 Use only elevators assigned for Contractor use for moving men and material within buildings. Protect walls of elevators to satisfaction of Region prior to use and accept liability for damage, safety of equipment and overloading of existing equipment.

3.10. PROTECTION OF REGION'S PREMISES

- .1 Adhere strictly to the Region's requirements.

- .2 Confer with the Region concerning schedule, dust, and noise control prior to commencing Work in or adjacent to existing facilities where such Work might affect either those facilities or their occupants.
- .3 Execute Work with least possible interference or disturbance to occupants, public and normal use of premises.
- .4 Provide temporary means to maintain security when security has been reduced by Division 20.
- .5 Only elevators, dumbwaiters, conveyors, or escalators assigned for Contractor's use may be used for moving men and material within building. Protect walls of passenger elevators, to approval of Region prior to use. Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 Provide temporary dust screens, barriers, warning signs in locations where renovations and alteration Work is adjacent to areas which will be operative during Work.
- .7 Drawings indicate approximate locations of known existing underground and above ground facilities. Avoid damage to existing services. Bear cost of repairs and replacements.
- .8 Immediately advise Consultant when unknown services are encountered and await instructions.
- .9 Accept liability for costs incurred by the Region in repairing and cleaning equipment, etc., resulting from failure to comply with the above requirements.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Provide all labour, materials, products, equipment, and services to supply and install the basic mechanical materials indicated on the Drawings and specified in Division 20 of these Specifications.

1.2. IDENTIFICATION OF MECHANICAL SERVICES

- .1 Identify all mechanical services after finish painting is complete.
- .2 Use terminology consistent:
 - .3 with the Drawings and Specifications
 - .4 with the Region's requirements and standards.
- .5 Identify lay-in type acoustic ceilings used for access to equipment and components by a method acceptable to Consultant.
- .6 Mark valve and equipment identification on Record Drawings.
- .7 Provide typewritten master lists for each Equipment Room. Frame under glass. Insert copies in Operating and Maintenance Instruction Manuals.

1.3. PIPE AND DUCTWORK IDENTIFICATION

- .1 Provide SMS Wrap-Mark on all pipe coverings, using Wrap-Mark pipe markers with flow arrow and alternating wording. For outside diameters up to {150 mm} [6"], allow marker to completely wrap pipe. For larger outside diameters, secure markers with stainless steel springs. Secure markers on vertical piping and elsewhere where markers could be inadvertently moved.
- .2 Use stencils and stencil paint on ductwork or ductwork insulation. Apply solid black capitalized lettering {50 mm} [2"] high and solid black flow arrows {150 mm} [6"] long x {50 mm} [2"] wide.
- .3 Locate identification and flow arrows so they can be seen clearly from floor and service platforms.
 - .1 at least once in each room
 - .2 at each piece of equipment
 - .3 at each branch close to connection point to main piping and ductwork
 - .4 at not greater than intervals of {15 metres} [50 ft] on straight runs of exposed piping and ductwork
 - .5 at entry and leaving point to pipe and duct chases, or other concealed spaces.

- .6 both sides where piping and ductwork passes through walls, partitions, and floors.
 - .7 on vertical pipes and ducts approximately {1800 mm} [6 ft] above floor
 - .8 behind each access door and panel
 - .9 at valves, identify piping upstream of valves and identify branch, equipment, building part or building serviced downstream of valve.
- .4 Colour code pipes to meet code and Region's requirements. At minimum, colour code pipes with {50 mm} [2"] wide bands in accordance with the detail shown on the drawings.
- .5 Identify electrical tracing of pipes on pipe insulation.

1.4. VALVE TAGS

- .1 Provide {40 mm} [1-1/2"] dia., {1 mm} [0.040"] thick brass tags with {10mm} [3/8"] high die-stamped black letters.
- .2 Attach to valves with {100 mm} [4"] long brass chains.
- .3 Tag all valves except for small valves isolating a single piece of equipment such as a unit heater, fan coil unit, terminal reheat coil and radiation section.

1.5. EQUIPMENT NAMEPLATES

- .1 Identify equipment, starters, and remote-control devices in a manner consistent with the Drawings.
- .2 Use solid black capitalized lettering {100 mm} [4"] high.
- .3 Where equipment size does not permit stencil identification, use lamacoid labels, engraved white on black, mechanically fastened to the equipment. Minimum lettering size {10 mm} [3/8"].

1.6. FLOW DIAGRAMS

- .1 Prepare neat diagrams {1200 mm x 900 mm} [48" x 36"] of piping systems to identify equipment and valves.
- .2 Insert legible page size copies into each Operating and Maintenance Manual.
- .3 Install diagrams, framed under glass, on Equipment Room walls where directed by Region.

PART 2 - PRODUCTS

2.1. INSERTS

- .1 Submit proposed materials and methods for cast-in-place inserts.

- .2 Where inserts must be placed after concrete is poured, use Phillips Red Head Multiset II Anchor system or equivalent Hilti System.

2.2. PIPE HANGERS

- .1 Provide pipe hangers and supports for all piping. Provide hangers in accordance with the following requirements. Provide steel supports in accordance with the subsequent article in this Specification section. Provide galvanized steel hangers and supports with galvanized fittings and accessories where exposed to direct contact with water or to possible high humidity conditions where condensation can occur.
- .2 Provide manufactured hangers, accessories and supports in accordance with ANSI B31.1 and MSS SP58, SP69, SP89 and SP90 similar to the Grinnell or Myatt figures numbers below.
- .3 Select products to ensure adequate safety factors under anticipated loads.
- .4 Provide upper attachments as follows:
 - .1 Standard beam clamp for normal service - Grinnell Fig 133 with Fig 290 or Fig 278 or Myatt Fig 500 with Fig 480 or Fig 440.
 - .2 Standard side beam clamp for normal service - Grinnell Fig 225 or Myatt Fig 505.
 - .3 Top beam clamp - Grinnell Fig 92 or Myatt Fig 406.
 - .4 C clamp - Grinnell Fig 86 or Myatt Fig 586.
 - .5 Angle clip for light duty side mounting - Grinnell Fig 202 or Myatt Fig 542.
- .5 For vertical adjustment of hanger rods, provide forged steel turnbuckle - Grinnell Fig 230 or Myatt Fig 475.
- .6 Provide pipe attachments as follows:
 - .1 Adjustable swivel rings for uninsulated fire service piping - ULC and FM approved - Grinnell Fig 69 or Myatt Fig 41.
 - .2 Clevis hanger for copper piping up to and including {100 mm} [4"] diameter - Grinnell Fig CT-65 plastic coated or Myatt Fig 56 epoxy coated.
 - .3 Swivel ring hanger for copper tubing up to and including {25 mm} [1"] diameter - Myatt Fig 43 epoxy coated.
 - .4 Standard duty clevis hanger for steel piping - Grinnell Fig 260 or Myatt Fig 124.
 - .5 Standard duty long clevis hanger for steel piping - Grinnell Fig 300 or Myatt Fig 124L.
- .7 Provide vertical pipe supports as follows:

- .1 Riser clamp for copper pipe - Grinnell Fig CT121C plastic coated, or Myatt Fig 186 epoxy coated.
- .2 Riser clamp for steel or cast-iron pipe - Grinnell Fig 261 or Myatt Fig 182 or Fig 183.
- .8 Provide supports for other piping types such as plastic, mechanically fused or packed joint pipe according to the pipe manufacturer's published recommendations. Support piping continuously where required to prevent sagging.
- .9 Provide protection saddles where insulated piping is supported from below.
 - .1 For high temperature insulated pipe - Grinnell Fig 160 or Fig 165 or Myatt Fig 210 or Fig 240.
 - .2 For insulated pipe with vapour barrier for low temperature service, insulate pipe with calcium silicate at hangers and provide Grinnell Fig 167 or Myatt Fig 251.
- .10 Provide roll type supports where shown on the drawings and where longitudinal movement may occur. Provide single pipe rolls - Grinnell Fig 177 or Myatt Fig 262 where supported from below and Grinnell Fig 171 or Myatt Fig 261 where suspended. Provide spring cushions where slight vertical movement is likely, and cushioning required - Grinnell Fig 178 or Myatt Fig 880.
- .11 Provide Grinnell or Myatt engineered constant support hangers on piping subject to vertical movement exceeding {40 mm} [1 1/2"] due to vertical pipe expansion.

2.3. EQUIPMENT RIGGING SUPPORTS

- .1 Provide eyebolts suitable for block and tackle connection, adequately supported by the structure above for:
 - .1 heat exchanger and shell heads.
 - .2 pumps in Mechanical Equipment Rooms
 - .3 motors
 - .4 other equipment which will require block and tackle handling.

2.4. SLEEVES, WALL, AND FLOOR PLATES

- .1 For pipe sleeves, use machine cut and reamed standard weight steel piping.
- .2 Concealed perimeter risers and runouts may have sleeves of {1.31 mm} [18 gauge] galvanized steel set around section of insulation to provide freedom of movement of piping. Extend {50 mm} [2"] above finished floor level.
- .3 For piping through exterior walls, cooperate with the waterproofing trade at all times, and do not break any waterproofing seal without consent of the waterproofing trade. Provide waterproof link seals as detailed on Drawings.

- .4 Provide leak plates where pipe sleeves pass through exterior building walls. Each leak plate shall be a {3.42 mm} [10 gauge] steel plate, welded to the sleeve, {100 mm} [4"] diameter greater than sleeve outside diameter.
- .5 Provide {1.31 mm} [18 gauge] galvanized steel duct sleeves. Provide adequate bracing for support of sleeves during concrete and masonry Work. For fire rated floors and walls, build fire damper assemblies into structure to attain fire rated Construction, in a manner acceptable to the governing authorities.
- .6 Cover pipe sleeves in walls and ceilings of finished areas, other than Equipment Rooms, with satin finish stainless steel, or satin finish chrome or nickel-plated brass escutcheons, with non-ferrous set screws. Do not use stamped steel split plates. Split cast plates with screw locks, however, may be used.
- .7 Cover exposed duct sleeves in finished areas with {1.31 mm} [18 gauge] galvanized steel plates in the form of duct collars. Fix in position with non-ferrous metal screws.

2.5. PROVISION FOR PIPE EXPANSION, CONTRACTION AND BUILDING SHRINKAGE

- .1 Where space limitations do not permit the use of expansion loops or offsets, provide Flexonics Expansion Joints properly selected for system operating pressures according to the following:
 - .1 For piping up to and including {65 mm} [2-1/2"], select ends to suit specified pipe fittings. Pressure shall be external to the bellows. Pressure ratings for Model H and HB expansion compensated as {1400 kPa} [200 psi] and {1050 kPa} [150 psi].
 - .2 Steel Piping - Flexonics Model H expansion compensator with two-ply stainless-steel bellows.
 - .3 Copper Piping - Flexonics Model HB expansion compensator with two ply bellow, all bronze Construction.
 - .4 For piping {75 mm} [3"] and above, use flanged ends.
 - .5 Steel Piping - Flexonics controlled, flexing expansion joint with stainless steel pressure carrier, flanged ends.
 - .6 Copper Piping - Flexonics controlled, flexing expansion joint with monel pressure carrier, and brass flanged ends.
 - .7 Provide Victaulic 150/155 expansion joints for Victaulic piping systems.
 - .8 Submit for Consultant review prior to installation, drawings showing the location of expansion joints, anchors, and guides. Show details of proposed connection to structure and loads to be imposed. All Drawings must be signed by a Professional Engineer registered in the Province of Ontario.

2.6. ACCESS DOORS AND PANELS

- .1 Provide access to concealed mechanical equipment and components which require inspection, adjustment, repair, and preventive maintenance. Install systems and

components to result in a minimum number of access doors and panels. Install equipment and components in locations readily accessible through doors and panels.

- .2 Supply for installation by Other Contractors, doors, panels, and frames. Ensure that access doors and panels are properly located.
- .3 Select access doors and panels to suit Architectural finishes and large enough to provide adequate access to equipment and components. Where personnel must pass through, provide {600 mm x 450 mm} [24" x 18"] minimum size doors and panels. Otherwise, provide {300 mm x 300 mm} [12" x 12"] minimum size doors and panels.
- .4 Provide access doors and panels with a fire rating required by the code governing the fire rating of the structure.
- .5 In tile walls, and washroom walls, supply minimum {2.78 mm} [12 gauge] Type 304 stainless steel with #4 finish, with recessed frame secured with stainless steel countersunk flush head screws.
- .6 For all other surfaces, supply minimum {2.66 mm} [12 gauge] welded steel, flush type with concealed hinges, lock and anchor strap, and factory prime coat finish.

2.7. FLASHING

- .1 Provide flashing for pipe openings or premanufactured roof curbs.
- .2 Carry out all counterflashing for roof mounted mechanical equipment and for pipes and ducts passing through roof. Fit counterflashing over flashing or curb. Pitch pockets are not acceptable.

2.8. CONCRETE

- .1 Provide {100 mm} [4"] concrete housekeeping pads under all floor mounted mechanical equipment and supports. Extend pads over the full equipment base and isolator area.
- .2 Provide floating reinforced concrete bases, and floating floors which are specified under Sound and Vibration Control. Meet Division 23 05 48 requirements.
- .3 Concrete Work, including housekeeping pads, required for Division 20 Work, and shown on the Drawings will be provided under this contract.
- .4 Provide other concrete Work required for Division 20 Work, including reinforcing steel.

2.9. STEEL

- .1 Provide steel required for Division 20 Work including supports, framing of openings and lintels over openings.
- .2 Provide steel of adequate strength to support equipment and materials during all operating and test conditions.
- .3 Support suspended equipment from the bottom or from manufacturer's designated suspension points. Support tanks and similar equipment with adequate beam strength

by saddles with curvature to match the equipment. Continuously support other equipment.

- .4 Provide base supports for all pipe risers. Design to distribute operating and static loads.
- .5 Fabricate steel supports in contact with water or humidity conditions from materials having approved corrosion resistance or galvanize after fabrication or brush welds clean and apply a prime coat of rust inhibiting paint.

2.10. WELDING AND BRAZING

- .1 All welding and brazing shall conform to all rules and regulations which apply in the latest issues of the following codes and standards:
 - .1 Building Services Piping Code ANSI/ASME B 31.9 (latest edition)
 - .2 CSA B51 (latest edition), Boiler, Pressure Vessel, and Pressure Piping Code
 - .3 ASME Boiler Code - Section IX
 - .4 All requirements of the Technical Standards and Safety Authority (TSSA)
- .2 Welding shall conform to a welding procedure which must be in accordance with TSSA requirements and include materials, weld preparation, heat treatment and welding equipment to be used.
- .3 Qualify all welders for the project Work according to ASME equivalent testing procedures. The contractor shall not use welders, under any circumstances, for on site or offsite Work which are not qualified for the Work performed. Maintain records for all qualification testing, by welder and provide copies to the Consultant on request. Qualification will include welding and examination of test pieces.
- .4 Qualified welders shall be issued with an identification number and a stamp for use in identifying welds performed by an individual welder. Welding Work shall be identified using the identification number and the contractor shall maintain identification records.
- .5 Welds shall be full penetration, continuous and without defects. After deposition, each layer of weld shall be cleaned to remove slag and scale by wire brushing or grinding, then chipped where necessary to prepare for proper deposition of the next layer. The weld reinforcement shall not be less than {1.6 mm} [1/16"] and not more than {3.2 mm} [1/8"] above the normal surface of the joined sections. The reinforcement shall be crowned at the centre and shall merge into the base material without excessive shoulder or undercut.
- .6 Welding shall be made by machine or manual shielded metallic arc process. Direct current shall be used exclusively with the base material on the negative side of the line. Electrodes used shall be an approved all position rod type.
- .7 Provide a copy of TSSA registration and include with Maintenance Manuals

PART 3 - EXECUTION

3.1. EXCAVATION AND BACKFILL

- .1 Conform to the requirements of Division 01.
- .2 Ensure that excavation Work is executed to attain required inverts and grades.
- .3 Remove material excavated by Division 20 and not to be reused, from the site.
- .4 Carefully prepare the bottom of pipe trench. Use one of the following bedding methods:
 - .1 In firm undisturbed soil, lay pipe directly on the soil and shape soil to fit the lower 1/3 segment of pipe and fittings.
 - .2 In rock, shale and where noted, excavate to {150 mm} [6"] below and minimum {200 mm} [8"] on each side of pipe. Form a {150 mm} [6"] thick bedding using {10 mm} [3/8"] crushed stone. Provide continuous support over at least the lower 1/3 segment of pipe.
 - .3 In unstable soil, in fill and where soil has been disturbed during previous excavation Work, excavate to at least {150 mm} [6"] below bottom of pipe and form a reinforced concrete cradle supporting full length between firm support, or install piers down to undisturbed solid soil. Piers shall be at a maximum spacing of {2400 mm} [8 ft]. Provide at least one pier for each pipe length. Support over at least the lower 1/3 segment of pipe.
- .5 Where excavation is necessary close to and below the level of any footing, backfill with {14,000 kPa} [2000 psi] concrete to the level of the highest adjacent footing. Do not proceed with the Work prior to receiving written approval from Consultant.
- .6 Obtain approval from governing authorities and Consultant before backfilling.

3.2. PIPE, DUCT AND EQUIPMENT INSTALLATION

- .1 Locate distribution systems, equipment and materials for maximum usable space, optimum service clearances and to accommodate current requirements and identified future expansion.
- .2 Coordinate Division 20 services installation above typical floor modular ceilings to allow installation and future relocation of lights and air troffers without interfering with or requiring relocation of mechanical, electrical, or other services, or removal of ceiling grid.
- .3 Include all pipe and duct offsets required to eliminate interference with the Work of other Divisions.
- .4 Install equipment and materials to present a neat appearance. Run piping, ducts, and conduit parallel to or perpendicular to building planes. Conceal piping, ducts, and conduit in finished areas. Install so as to require a minimum amount of furring.
- .5 Install pipe, duct, and conduit straight, parallel, and close to walls and slab or deck underside, with specified pitch.

- .6 Use standard fittings for all direction changes. Do not use drilled tees and other field fabricated fittings.
- .7 Install eccentric reducers in horizontal piping to permit drainage and eliminate air pockets.
- .8 Where pipe sizes differ from connection sizes of equipment, provide reducing fittings between inline components such as valves, strainers and fittings, and equipment. Reducing bushings are not permitted.
- .9 Cap open ends of piping during installation.
- .10 Lay copper tubing so that it is not in contact with dissimilar metal and will not kink or collapse.
- .11 Use non-corrosive lubricant or teflon tape equal to Dow Corning and apply on male thread.
- .12 Provide brass adaptors or dielectric couplings wherever dissimilar metals are joined.
- .13 No pipe to be laid in water or when, in opinion of Consultant conditions are unsuitable.
- .14 Protect buried copper and steel piping with Tapecoat materials using procedures recommended by Tapecoat Company of Canada Limited, or other approved manufacturer.
- .15 Ensure that pipe installation does not transmit vibration to the walls and floors through which they pass.
- .16 Make provisions for neat insulation finish around equipment and materials. Do not mount equipment within insulation depth.
- .17 In electrical rooms and elevator machine rooms, provide drip trays under the entire length of all pipe within the confines of the room. Pipe drip tray to nearest floor drain.
- .18 Perform pipe welding to meet ANSI B31.9.

3.3. CONNECTIONS TO EQUIPMENT

- .1 Provide unions or flanges at all connections to equipment. Ensure that piping adjacent to equipment is readily removable for servicing and/or removal of equipment without shutting down entire system.
- .2 Install unions in piping up to and including {50 mm} [2"] pipe size. Install flanges in piping {65 mm} [2-1/2"] pipe size and larger.
- .3 Prevent galvanic corrosion by isolating copper and steel. Use red brass adapters, or completely isolate flanges using full face gaskets with bolts installed through phenolic sleeves with insulating fibre washers. Where the Plumbing Code prohibits the use of red brass adapters, use insulating couplings. Where system valves are required, solid brass isolating valves may be used in lieu of adapters or couplings.

- .4 Provide metallic code rated continuity link between flanges or unions, where pipe mains carry flammable fluids or gases.
- .5 Make all plumbing and sheet metal connections to equipment provided by the Region.

3.4. INSERTS

- .1 Size and space for the loads to be supported.
- .2 Properly locate and firmly secure inserts to forms before concrete is poured.
- .3 Place inserts only within main structure and not in any finishing materials.
- .4 When inserts are required in precast concrete, supply inserts and location drawings to the precast concrete supplier for casting into material. Otherwise, include the cost of having the precast concrete supplier install inserts at the site.
- .5 Do not use powder actuated tools.

3.5. HANGERS

- .1 Suspend piping, ductwork and equipment with all necessary hangers and supports required for a safe and neat installation. Ensure that pipes are free to expand and contract and are graded properly. Adjust each hanger to take its full share of the weight.
- .2 Suspend hanger rods directly from the structure. Do not suspend pipes, ducts or equipment from other pipes, ducts, equipment, metal Work or ceilings.
- .3 Provide auxiliary structural steel angles, channels, and beams where ductwork, piping and equipment must be suspended between joists or beams.
- .4 Use galvanized rods, steel support angles, channels, and beams where exposed to direct contact with water or to possible high humidity conditions where condensation can occur.
- .5 Space hangers to ensure that structural steel members are not over stressed. In no case shall pipe hangers be further apart than indicated in the tables. When requested, submit detailed drawings showing locations and magnitude of ductwork, piping and equipment loads on the structure. Provide calculations when requested by Consultant.
- .6 Do not use trapeze type hangers for support of piping, without prior review by Consultant. Where permitted, fabricate from angle or channel frames, and space hangers to suit the smallest pipe size.
- .7 Do not use hooks, chains, or straps to support equipment and materials.
- .8 For precast concrete Work, if inserts cannot be cast into members, pass hanger rods between the members and weld to steel plates resting on the upper surface of the precast material. To prevent raising of the hanger rod, apply a lock nut and {50 mm} [2"] minimum dia. flat washer tight against the under surface of the precast material.

- .9 Ensure that copper materials are completely isolated from ferrous materials. Use plastic or epoxy coated hangers and clamps. Use lead inserts between copper piping and other ferrous materials.
- .10 Provide round steel threaded rods meeting ASTM A-36. Provide cadmium plated rod and accessories where exposed to direct contact with water or to possible high humidity conditions where condensation can occur.
- .11 The following table establishes minimum standards of rod sizes and hanger spacing for steel and copper piping.

Maximum Horizontal Spacing of Supports			
Pipe Size	Rod Size	Steel	Copper
{mm} [in]	{mm} [in]	{m} [ft]	{m} [ft]
{12} [1/2]	{10} [3/8]	{1.5} [05]	{1.5} [05]
{20} [3/4]	{10} [3/8]	{1.8} [06]	{1.8} [06]
{25} [1]	{10} [3/8]	{1.8} [06]	{1.8} [06]
{32} [1-1/4]	{10} [3/8]	{2.4} [08]	{2.1} [07]
{40} [1-1/2]	{10} [3/8]	{2.7} [09]	{2.4} [08]
{50} [2]	{10} [3/8]	{2.7} [09]	{2.7} [09]
{65} [2-1/2]	{12} [1/2]	{3.0} [10]	{3.0} [10]
{75} [3]	{12} [1/2]	{3.0} [10]	{3.0} [10]
{90} [3-1/2]	{12} [1/2]	{3.0} [10]	{3.3} [11]
{100} [4]	{16} [5/8]	{3.0} [10]	{3.7} [12]
{125} [5]	{16} [5/8]	{3.7} [12]	{3.7} [12]
{150} [6]	{20} [3/4]	{3.7} [12]	{3.7} [12]

- .12 For steel pipe sizes larger than {600 mm} [24"], refer to Drawings.
- .13 In addition to these basic requirements, provide hangers in the following location:
 - .1 to eliminate vibration
 - .2 at points of vertical and horizontal change of direction of pipe
 - .3 at inline centrifugal pumps
 - .4 at valves and strainers

- .5 on mains at branch takeoffs
- .6 to avoid stress on equipment connections
- .14 Support horizontal cast iron soil pipe at each hub. Where groups of fittings occur, not more than three joints shall be between hangers.
- .15 Refer to applicable articles of the Specification regarding thermal insulation requirements. Unless shown specifically on Drawings, provide the following support methods.
 - .1 For insulated warm and hot water piping, for condensate piping and for steam piping up to {65 mm} [2-1/2"] diameter, support with hangers directly on piping.
- .16 Generally, support ducts with {2.7 mm} [12 gauge] by {25 mm} [1"] wide galvanized hangers or with {12 mm} [1/2"] dia. rods and {40 mm} [1-1/2"] rolled angle saddles to meet SMACNA or ASHRAE Standards.
- .17 Support vertical duct risers at each floor with rolled angle collars bearing on building structure.

3.6. SLEEVES, WALL PLATES, FLOOR PLATES

- .1 Set sleeves for piping and ductwork in conjunction with erection of floors and walls. Locate sleeves accurately in accordance with submittal drawings, and as follows:
 - .1 Through interior walls, set sleeves flush with finished surfaces on both sides.
 - .2 Through exterior walls above grade, set sleeves flush with finished surfaces on inside and to suit flashing on outside.
 - .3 For floors in Mechanical Equipment Rooms, Janitors Closets, Kitchens, and similar areas where a water dam is required, set sleeves flush to underside of structure, and extending {50 mm} [2"] above finished floor.
 - .4 For other floors, set sleeves flush to both finished surfaces. Refer to Room Finish Schedule.
- .2 Size sleeves to provide {25 mm} [1"] clearance around insulated piping and ductwork.
- .3 Provide continuous insulation runs through fire separations. Ensure that piping and ductwork do not touch sleeves or for warm and hot water piping and ductwork terminate insulation cover on each side of sleeve. For chilled water and domestic cold water piping, provide same thickness Manville Thermo-12 pipe insulation with all-purpose vapour barrier jacket through fire separation to a point {100 mm} [4"] on each side of fire separation.
- .4 Install leak tight seals to meet the manufacturer's requirements. Select the inside diameter of each wall sleeve opening to fit the pipe and leak tight seal, all to ensure watertight joint.
- .5 Additional sleeving requirements:

- .1 Provide sleeves for systems not part of Contract but identified to be required on Drawings.
- .2 Provide sleeves to accommodate compressed air piping and wiring conduits required for Division 20 Work.
- .3 Provide additional sleeves as required by Drawings to accommodate service requirements. Include for the cost of drilling and setting sleeves.
- .4 Fill unused sleeves through fire separations with firestop material (see Firestopping article). Fill other unused sleeves with suitable noncombustible materials.

3.7. FIRESTOPPING

- .1 Ensure that fire ratings of floors and walls are maintained.
- .2 Pack clearance spaces, fill all spaces between openings, pipes and ducts passing through fire separations and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.
- .3 Install firestopping systems using personnel trained or instructed by the product manufacturer.

3.8. PAINTING

- .1 Supply ferrous metal Work except piping and galvanized and stainless steel ductwork, with at least one factory prime coat, or paint one prime coat on job.
- .2 Clean and steel brush surfaces with welds. Then prime coat all steel supports and brackets.
- .3 On uninsulated piping, steel brush and prime coat welds.
- .4 Touchup or repaint all surfaces damaged during shipment or installation and leave ready for finish painting.
- .5 Prime coat material shall conform to Canadian General Standards Board Standard No. 1-GP-48.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 1, General Requirements and all documents referred to therein.
- .2 Provide all labour, materials, products, equipment, and services to supply and install thermal insulation, vapour barriers and finishes for mechanical Work as indicated on the Drawings and specified in this Section of these Specifications.
- .3 Insulation requirements shall comply with Part 5 of the Model National Energy Code of Canada, latest version and insulation thickness shown are the minimum acceptable.

1.2. SUBMITTALS

- .1 Submit samples and Specification sheets of all types of insulation materials specified in this Section of the Specifications. Include manufacturers installation instructions.

1.3. ENVIRONMENTAL REQUIREMENTS

- .1 Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulating cements.

1.4. QUALITY ASSURANCE

- .1 Insulation materials must be manufactured at facilities certified and registered with an approved Registrar to conform to ISO 9000 quality standard.

PART 2 - PRODUCTS

2.1. MATERIALS – GENERAL

- .1 Acceptable insulation manufacturers are Owens Corning Canada, Johns Manville, Manson Insulation Inc., Knauf Fiber Glass and Certaineed.
- .2 Provide insulation and covers in strict accordance with authorities governing combustibility and fireproofing of materials and in accordance with manufacturer's recommendations.
- .3 Provide non-combustible insulation, jackets and finishes having a Flame Spread/Smoke Developed rating of 25/50 or less, meeting CAN/ULC S-102 requirements.
- .4 Attain a complete and continuous vapour barrier over insulation applied to cold and dual temperature piping, sheet metal and equipment. Use either factory applied vapour barrier jacket or field applied Reinforced Foil Flame Resistant Kraft vapour barrier jacket. Apply to piping, fittings, valves and inline components, sheet metal and fittings and equipment. Seal longitudinal and circumferential laps with Childers CP82 or Bakor 230-39 adhesive. If vapour barrier jacket is not lapped, seal joints with self-adhering {100mm} [4"] wide plain aluminium foil tape or adhere {100mm} [4"] wide aluminium foil tape with Childers CP82 or Bakor 230-39 adhesive. Jacketing with self-adhesive

laps and self-adhesive vapour barrier tape will be an acceptable alternative closure system.

- .5 Recover all exposed insulation and insulation finishes with minimum {0.20kg/square metre} [6oz.] canvas, and two applications of Childers CP50 or Bakor 120-09 white fire-resistant coating. An acceptable alternative recovering will be PVC fitting covers and jacketing, installed as per manufacturer's instructions, and conforming to the specified Flame Spread/Smoke Developed Rating.
- .6 Recover insulation and insulation finishes outside the building or exposed to the weather with one {1.5mm} [1/16"] thick layer of Childers Encacel X or Bakor 110-26 fire retardant black mastic vapour barrier coating. Embed a layer of woven glass reinforcing fabric into the wet coating, lapping ends and edges at least {75mm} [3"]. Apply a top coating of {1.5mm} [1/16"] thick Encacel X or Bakor 110-26 over the entire surface of the fabric. Seal the entire covering to achieve a watertight assembly.
- .7 In lieu of above recovering of insulation and insulation finishes outside the building, aluminium jacket with aluminium fittings may be substituted. Band all transverse seams with waterproof mastic tape and caulk all longitudinal seams with silicone caulking. Seal the entire covering to achieve a watertight assembly.

2.2. PIPE INSULATION

- .1 Provide insulation materials with a minimum thermal conductivity of {0.036 W/m.°C} [0.24 BTU.in/(hr.ft²°F)] at {38°C} [100°F] mean temperature.
- .2 On hot piping applications, hold insulation in place with flare type staples (outward clinch).
- .3 On cold and dual temperature piping applications, apply vapour barrier jacket over insulation and seal longitudinal and circumferential laps with Childers CP82 or Bakelite 230-39 adhesive. Seal all pipe terminations, including fittings, wall penetrations and pipe supports with vapour barrier mastic. For chilled water and brine systems provide vapour seal pipe terminations every four (4) pipe sections.
- .4 Apply pipe insulation over {40mm} [1-1/2"] in thickness in two layers with joints staggered.
- .5 Insulate fittings with fabricated metered or preformed sections of specified insulation.
- .6 Insulate over flanges and mechanical couplings with specified insulation and thickness, sized to suit flange diameters. Fill spaces between insulation and adjoining pipe insulation with similar material.
- .7 Insulate valves and inline components with flexible insulation density {12kg/cubic metre} [3/4lbs./cu.ft.] compressed not more than 50% of original thickness. Build up to specified thickness with approved asbestos free finishing cement.
- .8 Do not insulate terminal unit automatic control valves installed in hot piping. Do not insulate terminal unit automatic control valves which are installed in cold and dual temperature piping, and which are located over condensate drain pans.

- .9 Provide removable {1.31mm} [18gauge] galvanized sheet metal enclosures lined with Armaflex II sheet insulation {25mm} [1"] thickness on pipeline strainers to facilitate screen access.
- .10 Under all hangers used on primary chilled water, domestic chilled water, domestic chilled water recirculation, dual temperature water and domestic cold water, provide an insert between support shield and piping for piping {38 mm} [1½"] or larger. Fabricate using T-12 calcium silicate or other high density insulating material suitable for temperature application. Insulation inserts shall not be less than the following lengths:
- .11

Pipe Size	Length
{40 mm - 60 mm} [1½" - 2½"]	{250 mm} [10"]
{75 mm - 150 mm} [3" - 6"]	{300 mm} [12"]
{200 mm - 250 mm} [8" - 10"]	{400 mm} [16"]
{300 mm and over} [12" and over]	{550 mm} [22"]
- .12 Provide one of the following pipe insulation types, and as scheduled in the Pipe Insulation Table.
 - .1 Type P1: Knauf Earthwool 1000° or equivalent with a factory applied vapour barrier jacket where scheduled. Provide Knauf Proto PVC jacketing or equivalent for all exposed areas.

.1 Pipe Insulation Table:

No	Duty	Insulation Type	Thickness	Vapour Barrier
1	Horizontal storm drain and horizontal sanitary drainage all pipe sizes	P-1	{25mm} [1"]	Yes
2	Horizontal condensate drains except with fan coil unit enclosure. all pipe sizes	P-1	{12mm} [1/2"]	Yes

2.3. SHEET METAL INSULATION

- .1 Provide insulation with a minimum thermal resistance of {0.036 W/m.°C} [0.25 BTU.in/(hr.ft2°F)] at {24°C} [75°F] mean temperature.
- .2 Prior to finishing of insulation of hot and cold exposed rectangular ductwork, provide corner beads similar to Roll-on Type.

- .3 Apply vapour barrier over insulation on cold and dual temperature ducts.
- .4 Circular silencers and acoustic plenums need not be externally insulated.
- .5 Ductwork and casings lined with acoustic insulation {25mm} [1"] or more in thickness need not be externally insulated.
- .6 Provide one of the following external sheet metal insulation types, and as scheduled in the Sheet Metal Insulation Table.
 - .1 Type D1: Knauf Earthwool Insulation Board or equivalent with a factory applied vapour barrier jacket where scheduled. Provide Knauf Proto PVC jacketing or equivalent for all exposed areas.
- .7 Sheet Metal Insulation Table:

No	Duty	Insulation Type	Thickness	Vapour Barrier
1	Outside air plenums and ducts Outside air supply fans	D1	{50mm} [2"]	Yes
2	Relief and exhaust air plenums	D1	{40mm} [1-1/2"]	Yes
3	Exhaust ducts between motorized dampers and building exterior or final {3m} [10 ft] of exhaust air ducts whichever is greater	D1	{25mm} [1"]	Yes
4	Rectangular supply ducts	D1	{25mm} [1"]	No
5	Round supply ducts	D1	{40mm} [1½"]	No

PART 3 - EXECUTION

3.1. PROTECTION

- .1 Protect the Work of other trades with tarpaulins.
- .2 Protect the Work of this trade from being defaced by other trades. Make good any damage and leave in perfect condition, ready for final painting.

3.2. INSTALLATION

- .1 Apply insulation over clean dry surfaces, firmly butting all sections together.
- .2 Apply insulation, vapour barriers and insulation finishes in strict accordance with manufacturer's recommendations.
- .3 Do not cover equipment nameplates with insulation.
- .4 Coordinate related Work with other Divisions.

END OF SECTION

PART 1 - GENERAL

1.1. SCOPE

- .1 Confirm with requirements of all Sections of Division 1 – General requirements and specifically any Division 1 General Commissioning Requirements, as it applies to the Work of this Section.
- .2 Provide Commissioning of mechanical systems provided under Divisions 20, 22, and 23.
- .3 Mechanical System installation, start-up, testing, preparation of O&M manuals and operator training are the responsibility of the Division 20 Contractors, with the coordination of the commissioning process the responsibility of the General Contractor/Construction Manager.
- .4 For equipment installed under Division 20, 22, and 23 provide labour and material as required to participate in the commissioning process, as outlined in this section.
- .5 The Mechanical Contractor shall hire an Air and Water Balancing Contractor who will conduct tests on the air and water systems. The Mechanical Contractor and the Air and Water Balancing Subcontractor shall co-ordinate and co-operate with the Region's Commissioning Authority.
- .6 The commissioning process shall include planning, scheduling, and providing the services identified in this Specification section and the testing and commissioning identified in the various sections of the Divisions 20, 22, and 23 Specifications.

1.2. PRODUCTS

- .1 Provide all instrumentation and equipment necessary to conduct the tests specified. Advise the Consultant and the Commissioning Consultant of instrumentation to be used and the dates the instruments were calibrated.

1.3. RELATED WORK

- .1 Commission mechanical systems in conjunction with:
 - .2 Section 20 04 00 Mechanical General Provisions
 - .3 Section 23 05 93 Testing, Adjusting, and Balancing (TAB)

1.4. REFERENCE STANDARDS

- .1 Comply with the latest edition of the following:
 - .2 ASHRAE Guideline 1.1-2007 HVAC & R Technology Requirements for the Commissioning Process as amended herein.

1.5. COMMISSIONING PROCESS

- .1 The Commissioning process develops, coordinates, and documents the following:
 - .1 Equipment start-up.
 - .2 Control system calibration.
 - .3 Testing and balancing.
 - .4 Verification and Performance Testing.
 - .5 Operation documentation.
 - .6 Operator training.
- .2 The Commissioning Program is divided into the following parts:
 - .1 Part 1: Pre-Start and Start-Up testing
 - .2 Part 2: Installation Verification testing
 - .3 Part 3: Performance Validation testing
 - .4 Part 4: Systems Operating Manuals
 - .5 Part 5: Operator Training

1.6. WORK INCLUDED

- .1 Commissioning Work of Division 20 includes, but is not limited to:
 - .1 Testing and start-up of equipment.
 - .2 Testing, adjusting, and balancing of hydronic and air systems.
 - .3 Cooperation with the Commission Authority in developing and implementation of the commissioning plan.
 - .4 Providing qualified personnel for participation in implementing commissioning test procedures, including seasonal testing required after the initial testing.
 - .5 Providing equipment, materials, and labour as necessary to correct Construction and/or equipment deficiencies found during the commissioning process.
 - .6 Providing operation and maintenance manuals, and as-built drawings to the Commissioning Authority for verification.
 - .7 Providing training and demonstrations for the systems specified in this Division.
- .2 Conduct complete and thorough evaluation and documentation of the operation and performance of all components, systems, and sub-systems, including the following equipment and systems:

- .1 Cooling generation systems
 - .2 Hydronic distribution systems
 - .3 Electric heating systems
 - .4 Air distribution and exhaust systems
 - .5 Building Automation Systems
- .3 Equipment and systems shall be tested in the operational mode.
- .4 Commission equipment supplied by the mechanical contractor, as well as equipment which has been pre-tendered, pre-purchased, or pre-ordered by the Region or their Agent, and the value of which has been assigned to the Mechanical Contractor or their sub-trades and is included in the value of the Work. Provide skilled tradespeople to operate various related mechanical equipment in support of the commissioning program.
- .5 Commission services to equipment, but not the equipment itself, where the supply of the equipment does not form part of the mechanical Work. Provide skilled tradespeople to operate various related mechanical equipment in support of the commissioning activities of other trades.
- .6 This Contractor and the manufacturers shall fill out the required test forms or provide other acceptable forms. The forms shall have been approved by the consultant and the Commissioning Authority before they are used.
- .7 At minimum, provide the following commissioning documentation:
- .1 recording completed Pre-start and Start-up procedures test results,
 - .2 recording completed Installation Verification and Performance Validation test results,
 - .3 As-built records.
 - .4 Operation and maintenance manuals
- .8 The final commissioning report will be prepared by the Commissioning Authority.

1.7. DEFINITIONS

- .1 Major deficiency – an item which if not corrected renders the equipment or system unsuitable or un-safe for use by the Region. Major deficiencies must be corrected as a condition for achieving Substantial Performance.
- .2 Minor deficiency - an item which does not impact of the operation of the equipment or system and will allow the Region to use the system safely. Minor deficiencies may be corrected before or after Substantial Performance but will not prevent certification of Substantial Performance of the Work.

1.8. COMMISSIONING SCHEDULE

- .1 Provide a detailed commissioning schedule for consolidation into the main Construction schedule.
- .2 Include:
 - .1 Equipment and systems start-up predecessors
 - .2 Time periods for pre-start and start up testing, verification and validation testing for each equipment and system.

1.9. DOCUMENTATION DELIVERABLES

- .1 Conform to the requirements of Specification section 20 04 00 and to the individual Division 20, 22, and 23 Specifications, for shop drawings, as-built shop drawings and as-built installation drawings requirements.
- .2 Identify documents including test documents, binder covers, etc. using equipment ID numbers provided on equipment schedules.
- .3 Scan original signed test reports, including verification and performance test reports, manufacturers service reports, etc. In Adobe Acrobat *.pdf latest format. For original document chapters, provide Adobe chapter referencing.
- .4 Submit three (3) copies of each completed and accepted Verification and Functional Performance Test reports, both preliminary and final issues. Test forms and reports shall be directed to the architect, with copies to the Consultant and the Commissioning Authority. The equipment data listed within the reports shall include as a minimum:
 - .1 Manufactures name, address, and telephone number.
 - .2 Distributors name, address, and telephone number.
 - .3 Make, model number and serial number, and
 - .4 Voltage and current ratings.
- .5 Collate final, accepted, and signed test results in separate binders as follows:
 - .1 Fire Protection
 - .2 Plumbing and Drainage
 - .3 HVAC Systems
 - .4 Building Management Systems
- .6 Ensure submitted documents are legible.

1.10. SUBSTANTIAL PERFORMANCE

- .1 Provide prior to Substantial Performance:

- .1 A complete set of accurate "as built" drawings shall be transmitted to the Commissioning Authority a minimum of one (1) month prior to Substantial Performance.
- .2 A copy of equipment Specifications shall be transmitted to the Commissioning Authority a minimum of one (1) month prior to substantial Performance.
- .3 "Sequence of operation" narratives shall be transmitted to the Commissioning Authority a minimum of one (1) month prior to Substantial Performance. Include all set points and timing sequences.
- .4 A copy of Factory Acceptance Test (FAT) reports shall be completed and transmitted to Commissioning Authority a minimum of one (1) month prior to Substantial Performance. FAT reports must have been made available for review by the Consultant in a timely manner, to permit completion and transmission of the said reports prior to the period specified herein.
- .5 A copy of site start-up reports shall be transmitted to the Commissioning Authority a minimum of five (5) business days prior to Substantial Performance.

1.11. TEST EQUIPMENT

- .1 Furnish tools and equipment required during the commissioning process.
- .2 Utilities (water, gas) are provided by the Region.
- .3 Provide any proprietary test equipment and software required by equipment manufacturer for programming and/or start-up, whether specified or not.
- .4 Manufacturer provides test equipment, demonstrate its use, and assist in the commissioning process as needed.
- .5 Turn-over proprietary test equipment to the Region upon completion of the commissioning process, where such requirement is specified in the relevant equipment Specification sections.

PART 2 - PRODUCTS

2.1. GENERAL

- .1 Complete all phases of Work so that the systems can be started, tested, balanced, and Region's acceptance procedures be undertaken in a timely manner such that only one acceptance test is conducted at any one time.
- .2 Participate and assist in the development of the Commissioning Plan and schedule by the General Contractor, by providing necessary information pertaining to the equipment and installation. Provide commissioning schedule information to be incorporated into the overall Construction Plan schedule.
- .3 Acceptance procedures may begin prior to completion of a system and/or sub-system. Start of acceptance procedures before system completion does not relieve the

Contractor from completing those systems in accordance with the commissioning and Construction schedule.

2.2. PARTICIPANTS

- .1 Commissioning Team consists of multiple parties with separate responsibilities.
- .2 Region:
 - .1 Establishes acceptance criteria,
 - .2 Provides operations staff to receive training, and to witness any or all tests at their discretion,
 - .3 Final acceptance of commissioning results.
- .3 Consultant:
 - .1 Responsible for the Construction review activities in accordance with local building code requirements,
 - .2 May participate in development and/or review of commissioning procedures,
 - .3 Reviews commissioning test results,
- .4 Commissioning Authority:
 - .1 Develops commissioning plan and procedures,
 - .2 Coordinates Region's commissioning team members who witnesses tests,
 - .3 Selectively witnesses commissioning tests on an audit basis to confirm compliance by the contractor to the Commissioning Plan.
 - .4 Reviews commissioning test results and makes recommendations to the Region for acceptance.
- .5 General Contractor/Construction Manager
 - .1 Coordinates and manages commissioning activities,
 - .2 Develops and integrates commissioning activities into the Construction schedule,
 - .3 Ensures commissioning procedures are completed and documented, and commissioning records including any required attachments are submitted.
- .6 Mechanical trades Contractors ("Commissioning Agent"):
 - .1 Provide the services of qualified technician(s) who are familiar with the Construction and operation of the system, to start-up and debug equipment and systems within the Division 20 scope of Work. Include for labour, materials, and subsistence costs for these same technicians to assist the Commissioning Authority in completing the commissioning program.

- .2 Provide access to the contract plans, shop drawings, and equipment cut sheets of all installed equipment.
- .3 Ensure the qualified technician(s) are available and present during commissioning testing to complete the tests, make adjustments and to assist in problem resolutions.
- .4 Should any equipment or system experience performance problems and/or reconstruction or replacement of components is required, include for additional technician time for subsequent retesting of systems until required system performance is achieved.
- .5 The Commissioning Authority reserves the right to approve proposed technicians with regard to the technical skill level required for each type of equipment and/or system, and willingness by the individual(s) to Work within the Commissioning Group.
- .7 Controls Contractor, in addition to the requirements described above:
 - .1 Provide test reports using own documentation formats, for wiring tests, loop testing, loop tuning, and sequence functional tests.
 - .2 Provide details of the control system, schematics, and a narrative description of control sequences of operation.
- .8 Independent Testing Organizations (ITOs)
 - .1 The services of ITO's shall be provided by the Division 20 Contractor as detailed in the Division 20 series of Specification sections.
 - .2 The ITO's shall provide schedules of their Work and issue reports and completed test forms on a monthly basis. They shall attend Commissioning Meetings and report the progress of Contractor commissioning to the Consultant.
- .9 Equipment Suppliers:
 - .1 Provide the services of manufacturer's service personnel to provide assistance with pre-start and initial start-up of the equipment, as required.

PART 3 - EXECUTION

3.1. COMMISSIONING MEETINGS

- .1 Participate in periodic commissioning team meetings, and trade commissioning meetings.
- .2 Pre-Construction:
- .3 Participate in a pre-Construction meeting of commissioning team members, to familiarize parties with the commissioning process, and to ensure that the responsibilities of each party are clearly understood.

- .4 Construction and Post-Construction:
- .5 Participate in commissioning meetings as scheduled by the General Contractor.
- .6 Participate in trade commissioning meetings as required, in addition to the regular commissioning team meetings.
- .7 Identify to the commissioning group problems relating to the commissioning schedule, identification of start-up issues, etc., and participate in the resolution of these problems.

3.2. COMMISSIONING PROCEDURES

- .1 Each commissioning procedure tests the equipment and systems, and consists of the following elements:
 - .1 Document Sign-off.
 - .2 Pre-start and Initial test
 - .3 Installation Verification – Equipment
 - .4 Installation Verification – System
 - .5 Performance Validation
 - .6 Controls Validation
 - .7 Appendices.
- .2 Document Sign-off:
 - .1 Each completed procedure is signed off by the following parties:
 - .1 Contractor, for testing,
 - .2 Commissioning Authority, for review and witnessing,
 - .3 Region, for test acceptance.
- .3 Pre-Start and Initial Test:
 - .1 Checklists included: confirmation of authority's inspections, pre-start safety checks (where applicable), system cleaning and pressure testing, and confirmation of availability of supporting systems.
- .4 Installation Verification – Equipment
 - .1 Checklists to verify the installation of equipment. Including: design Specification requirements, drawing requirements, manufacturer installation requirements, and other experience-related items.

- .2 Use of pre-printed manufacturer installation and start-up checklists are permitted and encouraged; however, the commissioning procedure checklists may contain supplemental items.
- .5 Installation Verification – System:
 - .1 Checklists to verify the installation of the system associated with the equipment.
- .6 Performance Validation:
 - .1 Specific test procedures and record documentation requirements for performance measurements of the various systems.
- .7 Controls Validation:
 - .1 Step-by-step testing methodologies to prove the functional operation of control systems, for normal and abnormal operating conditions, and alarm conditions.
- .8 Appendices:
 - .1 Collate test reports from authorities having jurisdiction, manufacturer start-up and test reports, balancing reports, etc.

3.3. COMMISSIONING TEST METHODOLOGY

- .1 Step 1: Notify the Commissioning Authority in accordance with an agreed schedule and notification period when testing will begin on each procedure type. The Commissioning Authority will witness the testing on an audit basis, including the first instance, the last instance, and at random during other times.
- .2 Step 2: Complete the commissioning procedures including recording results, and sign-off and date separately the completion of Part “A” Verification, and Part “B” Validation. Any deficiencies discovered during this testing shall be corrected prior to sign-off of the test.
- .3 Step 3: On completion of systems which do not require witness demonstration, finalize the report, and submit to the Commissioning Authority and the Consultant for review.
- .4 Step 4: On completion of systems which have been witnessed by the Commission Authority, the Commissioning Authority is to sign-off the completed procedure document as being witnessed.

3.4. COMMISSIONING IMPLEMENTATION

- .1 Conduct operating tests and checks to verify that all components, equipment, systems, and interfaces between systems, operate in accordance with contract documents.
- .2 Demonstrate and verify operating modes, interlocks, specified control sequences, specific responses to abnormal or emergency conditions, and verification of the proper response of the Building Automation System.
- .3 Validate the results of the TAB report.

- .4 Roles and Responsibilities:
 - .1 Organized by: General Contractor
 - .2 Test sheets provided by: Commissioning Authority
 - .3 Testing conducted by: Div 20 Contractors
 - .4 Testing recorded by: Div 20 Contractors
 - .5 Tests witnessed by: Commissioning Authority (selected tests) and Consultant (selected tests)
 - .6 Reports reviewed by: General Contractor, Commissioning Authority, Consultant and Region
 - .7 Reports accepted by: Region.

3.5. OPERATING CHECKS

- .1 The Commissioning Authority witnesses selected equipment and system tests on an audit basis.
- .2 Set the system equipment into operating mode to be tested including but not limited to:
 - .1 Normal shut-down
 - .2 Normal auto position
 - .3 Normal manual position
 - .4 Unoccupied cycle
 - .5 Emergency power operation, including transition states.
 - .6 Alarm conditions.
- .3 Inspect and verify the position of each device and interlock identified on the checklist.
- .4 Repeat the above tests for each operating cycle that applies to the system being tested.
- .5 Check the operating condition of the following elements during all modes of operation of the system:
 - .1 Safety interlocks
 - .2 Alarms
 - .3 Smoke control and smoke venting interlocks.
 - .4 Life safety systems

- .6 For failed test items, provide appropriate comments to the checklist data sheet and classify whether it is a “Major” or “Minor” deficiency.
 - .1 The Consultant retains the right to make the final decision regarding classifications of deficiencies.
- .7 Verify the operational control of the systems through the Building Management System as follows:
 - .1 TAB airflow rates and calibrate terminal boxes in all modes of operation.
 - .2 Equipment operation in both heating and cooling modes.
 - .3 Minimum outdoor air intake positions, air-side economizer cycles, and multi-set outdoor air damper position as required for each operating sequence and mode.
 - .4 Building pressurization and other specialty programs
- .8 Verify the proper responses of instrumentation and control devices (actuators) as follows:
 - .1 For each controller or sensor, record the indicated monitoring and control system reading, and the test instrument reading.
 - .2 If the initial test indicates that the test reading is outside of the control range of the installed device, check the calibration of the installed device and adjust as required. Re-test the deficient device and record the results on the checklist data sheets.
- .9 The Commissioning Authority witnesses the field verification of the final TAB report as follows:
 - .1 Select, at random, 10% of the report data for verification.
 - .2 The TAB contractor will be provided advance notice of the date of retesting, but not the equipment to be tested.
 - .3 The TAB contractor uses the same equipment and instruments used for collecting the original data.
- .10 Test failure is defined as:
 - .1 For all readings other than sound, a deviation of more than 10 percent from the TAB report results.
 - .2 For sound pressure readings, a deviation of 2 dB at any bandwidth, not including differences in background noise readings.
 - .3 A failure rate greater than 10% of the selected items (1% of all TAB test results) will result in rejection of the final TAB report.
- .11 Acceptance

- .1 The final reports will be reviewed by the Commissioning Authority and the Consultant, to determine if verification is complete and the operating systems are functioning in accordance with the contract documents.
- .2 The Commissioning Authority, in conjunction with the Consultant, reviews and makes final classification of all noted deficiencies. Correct deficiencies classified as "Major" before acceptance of the Verification stage.
- .3 The Region will make the final acceptance of test results.

3.6. PERFORMANCE VALIDATION TESTING

- .1 Conduct performance tests and checks to validate that equipment and system components are providing the required heating and cooling performance (capacity), including but not limited to:
 - .2 Capability of the hydronic systems to deliver the required flow rate, and temperature.
 - .3 Capacity of electric heating systems at design temperatures.
 - .4 Confirm the ability of the HVAC systems to deliver the required cooling/heating services, at the design supply air temperature, required static pressure, and proper outside air ventilation rate.
 - .5 Special testing requirements:
 - .6 Test chillers in accordance with ARI 590 and 591, at design conditions for full load ratings, and IPLV ratings.

3.7. PROBLEM RESOLUTION

- .1 In the event that additional Work is required to either correct systems, misapplied equipment, and/or deficient performance under varying load conditions, assist the Region and Commissioning Authority in developing and acceptable resolution to the problem, including the resources of equipment suppliers.
- .2 The Region has final approval over any additional Work required to achieve the required level of performance.
- .3 Complete corrective Work in a timely fashion to permit the completion of the commissioning process.

3.8. ACCEPTANCE

- .1 Any identified deficiencies will be reviewed by the Consultant in conjunction with the General Contractor/Construction Manager to determine if correction of the deficiency is as a result of a defect in the equipment or installation.
- .2 If it is determined the performance deficiency is as a result of a defect in the equipment or its installation, rectify the deficiency and repeat the performance test until the required performance levels are achieved.

- .3 If it is determined the equipment or system has been constructed in accordance with the contract documents, the Region will decide whether to accept the performance as is or direct the installation contractor to make changes to the system as required to obtain performance levels which meet the design intent and retest the system.

3.9. SEASONAL COMMISSIONING

- .1 Commence initial performance validation testing commissioning at the completion of the installation and verification testing phase. Conduct performance testing, which is weather dependent, as applicable to current seasonal conditions. Complete performance testing on non-weather dependant systems in accordance with the agreed commissioning plan schedule.
- .2 For out-of-season system performance testing, conduct initial performance tests to demonstrate off-peak load performance. Schedule peak load performance testing over the succeeding nine (9) months to ensure all equipment is tested at peak load prior to the expiry of the warranty period.
- .3 Test heating equipment/systems during winter design extremes.
- .4 Test cooling systems during summer design extremes with a fully occupied building.
- .5 Alternatively, provide temporary equipment (load banks, etc.) to simulate full load conditions. Submit proposed methodology for review by the Commissioning Authority and Consultant.

3.10. ADDITIONAL COMMISSIONING

- .1 Additional commissioning activities may be required after completion of system performance testing. Include in the tender cost a reasonable reserve to complete this Work, including assistance from manufacturer's service technicians.

3.11. SYSTEMS OPERATING MANUALS

- .1 Provide Operating and Maintenance Manuals in accordance with the requirements of Section 20 04 00.
- .2 The Systems Operating Manuals (SOM) are in addition to the Operating and Maintenance Manuals (OMM) required under Section 20 04 00.
- .3 Provided by Commissioning Authority and/or Consultant.

3.12. SYSTEMS DEMONSTRATIONS

- .1 Provide system demonstrations are required by Specification section 20 04 00, including the requirements of all Division 26, and 28 series of Specification sections, as applicable.
- .2 The system demonstrations to the Engineer and the Commissioning Authority shall occur when:
 - .1 The installation is complete, and

- .2 The Division 20, 22, and 23 Contractor's testing is complete.
- .3 The systems demonstrations shall be conducted by the Division 20 Contractor and the equipment/systems suppliers and manufacturers. The demonstrations shall cover a physical demonstration of equipment installation and operation.

3.13. TRAINING

- .1 Conform to the requirements of Specification section 20 04 00 and to the individual Division 20, 22, and 23 Specifications, for equipment and systems training requirements, including number of training sessions and session durations.
- .2 For each training session, submit a course outline to the Architect, the Consultant, and the Commissioning Authority, for review by same, at least one (1) month prior to commencement of each training session.
- .3 Organize and schedule each training session to deliver the required instruction in an efficient and effective manner on a schedule agreed upon with the Region. Allow for two (2) training sessions for each topic, separated by approximately one week each, to allow for shift coverage.
- .4 Structure each training session based on type of maintenance personnel attending the training session, e.g. controls technicians, plumbers, fitters, general maintenance, etc. Develop the proposed training plan and obtain approval from the Region well prior to commencing the training.
- .5 Complete the training as close to Substantial Performance as possible, so that the Region's operations staff are fully prepared to operate the system after Substantial Performance is certified.
- .6 Training Manuals:
 - .1 Provide printed and electronic training material hand-outs for each session.
 - .2 Collect training material and bind into separate binders. Coordinate required quantities with the Region.
- .7 Equipment Training:
 - .1 Provide equipment training in accordance with Section 20 04 00 and the relevant equipment Specification sections.
 - .2 The training sessions shall be scheduled and coordinated by the Contractor. The Commissioning Authority may attend and video tape the sessions.
 - .3 Training shall be provided by qualified technicians, manufacturer's representatives, or electricians, and shall emphasize operating instructions and preventative maintenance.
 - .4 Structure each session to start with the classroom instruction for the overall system, followed by hands-on instruction for each equipment, with the services of the manufacturer's representative provided as required. Demonstrate the start-up and shut down of each equipment.

3.14. SYSTEM TRAINING:

- .1 In addition to the equipment training described above, provide additional training to describe the operational requirements and design intent of each system.
- .2 The training sessions shall be scheduled and coordinated by the Contractor. The Commissioning Authority may attend and video tape the sessions.
- .3 Include classroom instruction, delivered, in person, by competent instructors. Place emphasis on overall systems diagrams and descriptions, and design criteria and conditions.
- .4 Include instruction at the system's equipment, delivered, in person, by competent instructors. Place emphasis on overall systems diagrams and descriptions, and design criteria and conditions.
- .5 If required, obtain, and pay for the services of the Consultant to provide the instructor services and to provide lecture material for inclusion in the training manual.
- .6 Structure each session to start with the classroom instruction for the overall system, followed by hands-on instruction for each equipment, with the services of the manufacturer's representative provided as required. Demonstrate the start-up and shutdown of each system.
- .7 Minimum Training Session Content Requirements:
 - .1 At a minimum, each training session shall be structured to cover the following:
 - .2 Types of installed systems
 - .3 Design intent and design criteria.
 - .4 Design constraints.
 - .5 Different operating modes – occupied, unoccupied, emergency conditions, etc.
 - .6 Seasonal operating modes
 - .7 IAQ
 - .8 Energy efficiency
 - .9 System operation
 - .10 Automatic controls
 - .11 Service, maintenance, diagnostics, and repairs.
 - .12 Use of reports and logs
 - .13 Troubleshooting

- .8 Organize and schedule each training session to deliver the required instruction in an efficient and effective manner on a schedule agreed upon with the Region. Allow for two (2) training sessions for each topic, separated by approximately one week each, to allow for shift coverage.
- .9 Structure each training session based on type of maintenance personnel attending the training session, i.e. Plumbers, fitters, general maintenance, controls technicians, etc. Develop the proposed training plan and obtain approval from the Region before commencing the training.
- .10 Complete the training as close to Substantial Performance as possible, so that the Region's operations staff are prepared to operate the system after Substantial Performance is certified.
- .11 Training Manuals:
 - .1 Provide training material hand-outs for each session.
 - .2 Collect training material and bind into separate binders.

3.15. WARRANTY

- .1 Conform to the requirements of Specification section 20 04 00 and to the individual Division 20, 22, and 23 Specifications, for warranty requirements.

3.16. SYSTEMS AND EQUIPMENT TURNOVER

- .1 Conform to the requirements of Specification section 20 04 00 for turnover requirements.

3.17. COMMISSIONING PROCESS ALLOCATION

- .1 The commissioning process shall be allocated a value equal to 5% of the contract. The Mechanical Contractor may draw from this allocation as the commissioning process is completed.
- .2 The Consultant will use the submitted test and verification forms to calculate percentage complete.
- .3 The Mechanical Contractor may claim up to 3% of the contract from this allocation leading up to performance testing. The remaining 2% shall not be paid out until the performance testing, the Operation & Maintenance manuals and the training have been completed satisfactorily.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install all fans indicated on the Drawings and specified herein.

1.2. REFERENCES

- .1 ASME A13.1 - Scheme for the Identification of Piping Systems.

1.3. SUBMITTALS

- .1 Submit list of wording, symbols, letter size, and colour coding for mechanical identification.
- .2 Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- .3 Product Data: Provide manufacturers catalogue literature for each product required.
- .4 Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 - PRODUCTS

2.1. NAMEPLATES

- .1 Fasten nameplates securely in a conspicuous place. Where nameplates cannot be mounted on cool surface, provide standoffs.
- .2 Identify equipment type and number and service of areas or zone of building served.
- .3 For each item of equipment which may be started automatically or remotely, add a red lamacoid plate, 2-1/2" x 9" (60 x 230 mm), reading: "WARNING. THIS EQUIPMENT IS AUTOMATICALLY CONTROLLED AND MAY START AT ANY TIME."

2.2. TAGS

- .1 Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background colour. Tag size minimum 1-1/2" (40mm) diameter.
- .2 Chart: Typewritten letter size list in anodized aluminium frame.

2.3. STENCILS

- .1 Stencils: With clean cut symbols and letters of following size:
- .2 3/4"-1-1/4" (20-30mm) Outside Diameter of Insulation or Pipe: 8" (200mm) long colour field, 1/2" (15mm) high letters.

- .3 1-1/2"-2" (40-50mm) Outside Diameter of Insulation or Pipe: 8" (200mm) long colour field, 3/4" (20mm) high letters.
- .4 2-1/2"-6" (65-150mm) Outside Diameter of Insulation or Pipe: 12" (300mm) long colour field, 1-1/4" (30 mm) high letters.
- .5 8" - 10" (200-250mm) Outside Diameter of Insulation or Pipe: 24" (600mm) long colour field, 2-1/2" (65 mm) high letters.
- .6 Over 10" (250 mm) Outside Diameter of Insulation or Pipe: 32" (800mm) long colour field, 3-1/2" (90mm) high letters.
- .7 Ductwork and Equipment: 2-1/2" (65mm) high letters.

2.4. SELF ADHESIVE PIPE MARKERS

- .1 Vinyl: Factory fabricated vinyl, 0.13 mm (5 mil) thick, preformed to fit around pipe or pipe covering.
- .2 Polyester: Factory fabricated polyester, 0.05 mm (2 mil) thick, coated with acrylic adhesive.
- .3 Plastic: Factory fabricated plastic film, roll formed, clear laminated to protect lettering

PART 3 - EXECUTION

3.1. PREPARATION

- .1 Degrease and clean surfaces to receive adhesive for identification materials.
- .2 Prepare surfaces for stencil painting.

3.2. INSTALLATION

- .1 Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer (VOC content not to exceed 680g/L).
- .2 Install tags with corrosion resistant chain.
- .3 Comply with standard detail drawing plate, "Detail of Piping Identification".
- .4 Apply stencil markings on all covered piping.
- .5 Install plastic tape pipe markers complete around bare pipe to manufacturer's instructions.
- .6 Identify natural gas piping in accordance with CAN1-B149.1
- .7 Label piping that is heat traced or equipped with heating cable "HEAT TRACED" in addition to other identification. Locate such labels adjacent to other identifications.
- .8 Install underground plastic pipe markers 6"-8" (150-200mm) below finished grade, directly above buried pipe.

- .9 Identify air handling units, fans, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- .10 Identify control panels and major control components outside panels with plastic nameplates.
- .11 Identify thermostats relating to terminal boxes or valves with nameplates.
- .12 Identify valves in main and branch piping with tags. Consecutively number valves in each system.
- .13 Identify air terminal units and radiator valves with numbered tags.
- .14 Tag automatic controls, instruments, and relays. Key to control schematic.
- .15 Identify piping, concealed, or exposed, with stencilled painting and plastic tape pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 6m on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
- .16 Identify covered ductwork with stencilled painting and bare ductwork with plastic tape duct markers. Identify ductwork with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- .17 For each item of equipment which may be started automatically or remotely, add a red lamacoid plate, 2-3/8" x 9" (60 x 230mm), reading: "WARNING. THIS EQUIPMENT IS AUTOMATICALLY CONTROLLED. IT MAY START AT ANY TIME."
- .18 Provide colour coded self-adhesive dots to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

3.3. SCHEDULES

- .1 Consult the Region and identify piping, ductwork and equipment as directed.
 - .1 conforming to the Region's existing identification practices, or
 - .2 conforming to the following Pipe and Valve Identification Table:

Pipe Marker Legend	Valve	Primary	Secondary
	Tag Legend	Colour	Colour
Natural Gas	GAS	Yellow	Black
Acidic Condensate	A.Cond.	Orange	Black
Sanitary	SAN	Green	White

- .2 The above lists are to be used as a guideline for colour coding only and is not intended to supersede lists of other authorities or agencies. (i.e. Ministry of Environment; Ministry of Government Services, Canadian Government Standards Board).

3.4. MANUFACTURE'S NAMEPLATE

- .1 Provide metal nameplates on each piece of equipment, mechanically fastened with raised or recessed letters.
- .2 Include registration plates, Underwriters' Laboratories and CSA approval, as required by respective agency, and as specified. Indicate size, equipment model, manufacturer's name, serial number, voltage, cycle, phase and power of motors, all factory supplied.
- .3 Locate nameplates so that they are easily read. Do not insulate or paint over plates.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with the requirements of Division 01 – General Requirements and to Division 20 – Mechanical General Requirements.
- .2 Provide labour, materials, products, equipment, and services required to complete the demolition Work specified herein.
- .3 Refer to Drawings for extent of demolition Work. The drawings indicate the approximate locations of services as far as these are known.
- .4 Dispose, off site, of all debris in accordance with the jurisdictional authorities.
- .5 Removal and storage of salvageable items as directed by this Specification section and the Region of their representative.
- .6 During the course of this Work, suspected hazardous or contaminated materials will probably be encountered.
- .7 Mechanical demolition Work associated with this building is indicated on the demolition drawings and generally and consists of the following:
 - .1 Sanitary waste
 - .2 HVAC systems and equipment
 - .3 Building Control Systems

1.2. REFERENCE STANDARDS

- .1 Meet the requirements and recommendations of all Municipal, Provincial and Federal Bylaws and Ordinances.
- .2 Execute this Work in accordance with the latest edition of the following codes and standards.
 - .1 CAN/CSA-S350-M1980 - Code of Practice for Safety in Demolition of Structures.
 - .2 Ontario Building Code.
 - .3 Occupational Health and Safety Act.
 - .4 Regulations for Construction Projects.
 - .5 Ontario Fire Code.
 - .6 Regulations under Fire Marshals Act.

1.3. QUALITY ASSURANCE

- .1 All Work shall be performed by a firm having adequate equipment and skilled labour and being able to provide written evidence of satisfactorily completed Work, similar to that specified during the past immediate five (5) years.
- .2 Removal from site and disposal of debris shall be carried out in accordance with the requirements of the local jurisdictional authorities.
- .3 Arrange and pay for all permits, notices, and inspections necessary for the proper execution and completion of the demolition Work.

PART 2 - PRODUCTS

2.1. DISPOSAL OF MATERIALS

- .1 All materials which have not been designated for salvage from the demolition shall become the property of the Contractor. Remove all material and debris from the site as quickly as possible and dispose of legally. Burning of debris or selling of materials on the site will not be permitted.
- .2 Present to the Region existing equipment removed but not identified for salvage on site. Acceptance of removed equipment is at the discretion of the Region. Remove such items from site when deemed unsuitable.
- .3 Conform to requirements of municipality's Works Department regarding disposal of waste materials.
- .4 Materials prohibited from municipality waste management facilities shall be removed from site and disposed to recycling companies specializing in recyclable materials.

PART 3 - EXECUTION

3.1. GENERAL INSTRUCTIONS

- .1 At the end of each Work shift, leave Work in a safe condition.
- .2 Patch fire rated partitions and floors to maintain rating upon removal of mechanical services originally spanning fire rated assembly.
- .3 Demolish Work into sections of practical size for removal without alteration or damage to existing building.

3.2. STORAGE OF MATERIALS

- .1 Store materials only in areas designated by the Region and as permitted by the local jurisdictional authorities.
- .2 Materials and debris shall not be stacked in building to the extent that overloading of any part of the structure will occur.

3.3. PROTECTION OF REGION'S PREMISES

- .1 Adhere strictly to the Region's requirements.

- .2 Confer with the Region concerning schedule, dust, and noise control prior to commencing Work in or adjacent to existing facilities where such Work might affect either those facilities or their occupants.
- .3 Execute Work with least possible interference or disturbance to occupants, public and normal use of premises.
- .4 Provide temporary means to maintain security when security has been reduced by Division 20.
- .5 Only elevators, dumbwaiters, conveyors, or escalators assigned for Contractor's use may be used for moving men and material within building. Protect walls of passenger elevators, to approval of Region prior to use. Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 Provide temporary dust screens, barriers, warning signs in locations where renovations and alternation Work is adjacent to areas which will be operative during Work.
- .7 Protect all mechanical systems, indicated to remain, from damage.
- .8 Provide and maintain ready access to firefighting equipment at all times.
- .9 Provide and maintain proper and suitable fire extinguishers throughout the duration of the Work.
- .10 The drawings indicate the approximate locations of services as far as these are known. Should any mechanical or electrical service line be broken, or disrupted by operations specified under this contract, repair service lines, and make good all damage due to the disruption or break, at no expense to the Region. Notify the Region immediately whenever any service line is broken or damaged.
- .11 The drawings indicate the approximate locations of services as far as these are known. Immediately advise Consultant in writing when unknown services are encountered.
- .12 Accept liability for costs incurred by the Region in repairing and cleaning equipment, etc., resulting from failure to comply with the above requirements.

3.4. RESTRICTIONS ON USE OF PREMISES

- .1 Use only those existing entrances and stairs designated by the Region for access to and egress from the existing buildings and various floors where Work of this contract is to be carried out. No traffic through other areas of the building will be permitted without the prior consent of the Region.
- .2 Keep stairs and corridors clear and open as required by Fire Marshall for exit purposes in case of fire, and as required for use by the Region's personnel.
- .3 Region will designate which toilet facilities may be used.

3.5. PREPARATION

- .1 Notify the consultant a minimum of 48 hours prior to commencing this Work.

-
- .2 Prior to commencing this Work arrange to have the appropriate trades concerned present for the disconnection of all utility services.
 - .3 Ensure that all existing services designated to remain are adequately protected.

3.6. TERMINATION OF EXISTING SERVICES

- .1 Arrange and pay for the disconnection, capping and for plugging of gas, water, sewer, storm, and other services to the building to be demolished. In each case the utility company involved shall be notified in advance and its approval obtained before commencing that portion of the Work. Disconnect and cap services at the locations indicated by the Consultant.

3.7. INTERRUPTION OF EXISTING SERVICES

- .1 Arrange, schedule, and perform Work with minimum disturbance to existing facilities and services.
- .2 Submit a complete schedule of service interruptions and changeovers with approximate dates required, durations and times of day, for approval before proceeding.
- .3 Notify Region in writing at least 72 hours in advance of planned interruption to existing services.
- .4 Interruption of service must occur at the times and for the duration stipulated by the Region.
- .5 Keep service interruption duration to an absolute minimum. Carry out all preparatory Work, measurements, etc., without interruption of existing services.
- .6 If service interruptions are required by the Region during the night or on weekends, etc., premium time shall be included at the Contract Price. No extra charges will be allowed at a later date for failure to include same.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 1 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install the plumbing and drainage inside the building to point of connection outside the exterior building wall as indicated on the Drawings and specified in this Section of the Specifications.

PART 2 - PRODUCTS

2.1. PIPE AND FITTINGS

- .1 Sanitary Waste and Vent
 - .1 Below Ground
 - .1 Sizes up to 2-1/2" (65mm): Copper tube ASTM B306, DWV seamless copper tube with cast bronze (ASME B16.23) or wrought copper (ASME B16.29) fittings and 95/5 soldered joints (ASTM B32).
 - .2 Sizes 3" (75mm) and larger: Cast iron soil pipe (CISPI 301) hub-less with cast iron fittings and joints (CISPI 310) with neoprene gasket, stainless steel clamp and shield.
 - .2 Above Ground
 - .1 Sizes up to 2-1/2" (65mm): Copper tube ASTM B306, DWV seamless copper tube with cast bronze (ASME B16.23) or wrought copper (ASME B16.29) fittings and 95/5 soldered joints (ASTM B32). Excluding fixture drain connections.
 - .2 Sizes 3" (75mm) and larger: Cast iron soil pipe (CISPI 301) hub-less with cast iron fittings and joints (CISPI 310) with neoprene gasket, stainless steel clamp and shield.
- .2 Condensate (Acidic)
 - .1 All Sizes: XFR rigid PVC drain, waste and vent pipe and fittings to CAN/CSA B181.2, complete with solvent weld joints, and dry fire barrier penetration seal. Clearly marked with the certification logo indicating a Flame Spread Rating not more than 25 and a Smoke Developed Classification not exceeding 50.

PART 3 - EXECUTION

3.1. VERIFICATION OF INVERTS

- .1 Verify all field service conditions immediately after award of Contract to ensure that drainage runs can meet the inverts of the site services.
- .2 Give notification immediately of any apparent difficulties or discrepancies.
- .3 No extra will be paid at a later date for rerouting of drains because site inverts cannot be met.

3.2. TESTING

- .1 Carry out not less than the following tests:
 - .1 Ball test drains.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply, install and test complete plumbing specialties indicated on the drawings and specified in this section of the Specifications.

PART 2 - PRODUCTS

2.1. FLOOR AND AREA DRAINS

- .1 Provide floor and area drains manufactured by Watts, Zurn, or Mifab to the following Watts model numbers.
- .2 Floor and area drains shall be one of the following types and sizes as shown on the Drawings.
 - .1 Type FFD - Watts Drainage Products FD-100-C-EG epoxy coated cast iron floor drain with anchor flange, reversible membrane clamp with primary and secondary weepholes, 1/2"(13mm) thick 5" (125mm) adjustable nickel bronze strainer, 4"(102)x9"(229) oval nickel bronze funnel, and no hub (MJ) outlet.

2.2. CLEANOUTS

- .1 Stack cleanouts shall be Watts CO-460-RD cast iron stack cleanout with gasketed brass countersunk plug, stainless steel access cover, vandal proof stainless steel screw, and no hub connections.
- .2 Line cleanouts shall be Watts CO-380-RD cast iron wall cleanout with gasketed brass countersunk plug, vandal proof stainless steel screw, and no hub connection.
- .3 Provide custom access doors to line cleanouts which require access through washroom tiled walls. Access door shall be stainless steel with friction fit door and have a recessed top to accept tile size used in washroom. Acudor Series UF5000SS.
- .4 Floor cleanouts shall be Watts CO-100-C-R epoxy coated cast iron cleanout with anchor flange, reversible membrane clamp, adjustable combined access cover and plug with gasket seal. Tops shall be round, heavy duty, scoriated nickel bronze, adjustable to finished floor. Cleanouts shall be complete with nickel bronze recessed tops where required to suit floor finishes.

2.3. TRAP PRIMING

- .1 Prime all floor drain traps with cold water.
- .2 For individual traps provide:

- .1 Precision Plumbing Products PR-500 bronze trap seal primers with integral vacuum breakers.
- .2 Precision Plumbing Products FVP-1VB chrome plated assembly with integral vacuum breaker.

PART 3 - EXECUTION

3.1. INSTALLATION

- .1 Install all plumbing specialties in accordance with the manufacturer's requirements and local authorities' requirements.

3.2. PROTECTION

- .1 Provide each floor drain with {0.15mm} [6 mil] polyethylene under strainer to prevent dirt from entering the system during Construction. Remove polyethylene from all drains immediately prior to Substantial Performance of the Work.

3.3. COORDINATION

- .1 Coordinate all drain and clean out provisions with final Construction.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install the sound and vibration control devices indicated on the Drawings and specified in this Section of the Specification.

1.2. QUALITY ASSURANCE

- .1 Provide vibration isolation and duct attenuators from a single sound and vibration control manufacturer, whose responsibilities shall include, but not be limited to:
 - .1 supply of all vibration and sound isolation equipment necessary to meet the performance requirements.
 - .2 coordination throughout the project with all provided equipment to ensure adherence to performance criteria.
 - .3 determination of equipment, pipe and duct mounting arrangements
 - .4 field supervision and inspection to assure proper installation and performance.
 - .5 allowance for expansion and contraction when selecting and applying isolation materials.
 - .6 coordination of any silencer provisions with sound power levels of fans specified elsewhere in this Specification.
- .2 Ensure the provision of adequate vibration and sound control equipment for all fans, pumps, ducts, pipes, chillers, boilers, cooling towers, air handling units and other mechanical equipment.
- .3 Ensure that no ducts and pipe installation transmit vibration to the walls and floors through which they pass.
- .4 Provide equipment, pipe, and duct mountings non-resonant with equipment operating and building structure natural frequencies.

1.3. SUBMITTAL REQUIREMENTS

- .1 Supply to the sound and vibration control manufacturer, a copy of certified Shop Drawings of equipment to be isolated and sound power levels of equipment requiring sound attenuators.
- .2 Submit Shop Drawings of sound and vibration control components including all calculations. For each piece of equipment to be isolated, identify on the shop drawings

the equipment's lowest operating speed, its weight, band, and the type and location of isolators.

- .3 Submit Shop Drawings showing adequate concrete reinforcing steel details and templates for all concrete foundations and supports, all bases including necessary concrete and steel Work and vibration isolation devices, and all required hanger bolts and other appurtenances necessary for proper installation of the equipment.

1.4. VIBRATION ISOLATION PERFORMANCE

- .1 For each piece of equipment to be isolated, select the vibration isolation mounts on the basis of 98% vibration isolation efficiency at the lowest operating speed. That is, the natural frequency of each vibration isolation system shall be no higher than 1/10 of the lowest excitation frequency of the rotating machinery, whenever practicable, but in no case greater than 1/7.
- .2 Where structural floor deflection will exceed 1/10 of the determined static deflection of the isolator, increase the isolator static deflection to maintain this minimum ratio of the floor to isolator deflection.
- .3 Static deflections shown on the drawings, specified, or scheduled are a guide only. Actual isolators are to achieve the required static deflection under load, with at least 50% reserve deflection.

PART 2 - PRODUCTS

2.1. ISOLATORS

- .1 All spring isolators shall be complete with levelling devices, {6 mm} [1/4"] thick ribbed neoprene sound pads and completely stable, colour coded springs.
- .2 Select springs to operate at no greater than 2/3 solid deflection.
- .3 Paint all hardware with zinc chromate. For applications subject to outdoor or high humidity conditions, neoprene coat springs, and paint mounts with two coats of rust resisting paint. Use neoprene instead of rubber when pads may be affected by outside weather conditions or oil contamination.
- .4 Piping connections to air compressors shall be isolated with FPM Metal Hoses.
- .5 Support equipment with one of the following types of isolators:
 - .1 Type CM: closed spring mounts with top and bottom housing separated with neoprene rubber stabilizers.
 - .2 Type FS: Open spring mounts having extra stable iso-stiff springs. (Horizontal stiffness shall be equal to vertical stiffness).
 - .3 Type CSR: Free standing restrained mounts with heavy rigid steel base frame, built-in limit stops and removable spacer plates. Springs shall be iso-stiff with a minimum horizontal to vertical stiffness (K_x/K_y of 1.0). The clearance around the bolt holes must be a minimum {12 mm} [1/2"] such that a +/-3-degree rotational misalignment may be tolerated. As an alternative provide rubber

- sleeve of minimum {3 mm} [1/8"] thick, not more than 60 Durometer hardness for limit stop bolts so that shortening would not be possible.
- .4 Type HCS: Similar to Type SH, suitable for horizontal installation to limit horizontal movement of isolated equipment.
 - .5 Type MD: Elastomer rubber mount with threaded insert and hold down bolt holes.
 - .6 Type R: Waffle pads shall be 50 durometer natural rubber {14,000 kPa} [2000 psi] tensile, a minimum of {12 mm} [1/2"] thick and selected for an optimum loading of {420 kPa} [60 psi]. When pads are built into spring isolators or hangers 50 durometer {21,000 kPa} [3000 psi] tensile pads are acceptable with an optimum loading of {630 kPa} [90 psi].
 - .7 Type N: Waffle pads shall be 30 durometer neoprene, {12,600 kPa} [1800 psi] tensile, minimum of {12 mm} [1/2"] thick and selected for an operating load of {630 kPa} [90 psi].
 - .8 Type RSR: Rubber-steel-rubber pads shall consist of two layers of {12 mm} [1/2"] thick Type R pad, as specified above, bonded to each side of {6 mm} [1/4"] steel plate. All holes to be sleeved and complete with an isolation washer.
 - .9 Type NSN (special): Neoprene-steel-neoprene pads shall consist of two layers of {12 mm} [1/2"] thick Type N pad, as specified above, bonded to each side of {1.6 mm} [1/4"] steel plate. All holes to be sleeved and complete with isolation washers.
 - .10 Type KIP: Kinetic pre-compressed moulded fibreglass pads shall be coated with a flexible moisture impervious elastomeric membrane. Glass fibres, produced by the multiple flame attenuation process shall have a diameter not exceeding {.0045 mm} [.00018"].

2.2. SPRING HANGERS

- .1 Select springs to operate at not greater than 2/3 solid deflection. Paint all hardware with zinc chromate primer.
- .2 Spring hangers shall be Type SH or Type SHR with completely stable, colour coded springs.
- .3 The spring and cup washer assembly shall have a single stable position under load.
- .4 All hangers must be capable of tolerating a vertical misalignment of +/-15 degrees without loss of stability.
- .5 Ensure that there is no physical contact between pipes and sleeves or pipes and structure.
- .6 Type SH: Shall have fabricated steel housing with one coat anti-rust paint, and be complete with a colour coded stable spring, retaining cups and acoustic washer.

- .7 Type SHR: shall be as for Type SH above but shall have a {25 mm} [1"] elastomeric element in lieu of acoustic washer.
- .8 Attach top of hanger frame rigidly to the structure. However, do not install spring hangers in concealed locations.
- .9 Suspend piping connected to isolated equipment with Type SHR spring hangers as follows:
 - .1 Up to {100 mm} [4"] pipe - at first 3 points of support.
 - .2 {125 mm to 200 mm} [5" to 8"] - at first 4 points of support.
 - .3 {250 mm} [10"] and larger - at first 6 points of support.
- .10 The first point of support shall have a static deflection of twice the deflection of the isolated equipment.
- .11 If, due to space restrictions, it is impossible to use at least two spring hangers, provide rubber hose to provide flexibility. Flexible metal hose may only be used when pressure rated rubber hose is not available. Provide control cables in lieu of control rods where alignment is required.
- .12 Ensure that there is no physical contact between pipes and sleeves, or pipes and structure.

PART 3 - EXECUTION

3.1. FLOOR MOUNTED EQUIPMENT

- .1 Erect floor mounted equipment on {100 mm} [4"] high concrete pads over complete floor area of equipment. Mount vibration eliminating devices and concrete inertia blocks on {100 mm} [4"] high housekeeping pads.

3.2. VIBRATION ISOLATION SYSTEMS

- .1 Have vibration isolator manufacturer determine mounting sizes. Install in accordance with manufacturer's instructions.
- .2 Installed vibration isolation system for each floor or ceiling supported equipment shall have a maximum lateral motion under equipment startup or shut down conditions of {6 mm} [1/4"]. Restrain excess motions by approved mountings.

3.3. MOUNTING SYSTEMS EXPOSED

- .1 Protect mounting systems exposed to weather and other corrosive environments with factory corrosion resistant coatings. Hot dip galvanized metal parts of mountings (except springs and hardware). Cadmium plate and neoprene coat springs. Cadmium plate nuts and bolts.

3.4. PIPE SUPPORT

- .1 Support piping as follows:

- .2 Resiliently support all suspended piping connected to isolated equipment.
- .3 Provide resilient diagonal mountings or other approved devices to limit piping motion due to equipment startup or shutdown, to a maximum deflection of {3 mm} [1/8"].

3.5. EXPANSION AND CONTRACTION

- .1 Allow for expansion and contraction when selecting and applying isolation materials.

3.6. NOISE LEVELS

- .1 Isolate equipment to attain acceptable noise criteria (NC) levels in occupied areas, using terms of reference set out by ASHRAE.
- .2 After systems have been balanced, take sound measurements throughout the complete range of audible frequencies from 63 Hz through 8000 Hz, in each occupied area above, below and beside each Mechanical Equipment Room and where directed. Plot readings on noise criteria NC curves.
- .3 Modify, as required and at no additional cost to the Region, the fan distribution, and other mechanical systems to achieve the specified noise criteria.
- .4 Submit a report, including sound curves, to substantiate that equipment has been isolated adequately, and that acceptable noise levels have been attained. Provide a list to indicate equipment in operation at time of readings taken. Certify report by Professional Engineer of Ontario.
- .5 Make sound measurements in accordance with the American Standard Method for the Physical Measurement of Sound, ANSI S1.2.
- .6 Sound measuring equipment shall be Type 2 Class I in accordance with ANSI Standards S1.4 or S1.11.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to test, adjust, and balance all air and hydronic systems to verify conformance to specified quantities and to the design intent of the mechanical system.
- .3 Refer to Specification 20 08 15 - Commissioning for commissioning activities to be performed by others. Cooperate with the Commissioning Agent.
- .4 The following systems and/or equipment are included in the Scope of Work:
 - .1 Air Systems:
 - .1 Supply Fans
 - .2 Diffusers, Registers, and Grilles
 - .2 Domestic Systems:
 - .1 Domestic Water Recirculation
- .5 Refer to Specification Section 23 31 00 for test openings in duct system. Provide additional openings to fulfil the Work of this section.

1.2. REFERENCE STANDARDS:

- .1 All Work shall be in accordance with the latest edition of the AABC or NEBB National Standards. If these contract documents set forth more stringent requirements than the Reference Standards, these contract documents shall prevail.

PART 2 - PRODUCTS

2.1. TEST EQUIPMENT

- .1 When requested by the Consultant, provide current calibration certificates for test equipment.

PART 3 - EXECUTION

3.1. GENERAL

- .1 The specified systems shall be reviewed and inspected for conformance to design documents. Testing, adjusting, and balancing on each identified system shall be performed. The accuracy of measurements shall be in accordance with AABC or NEBB Standards or "5%, whichever is more stringent.

- .2 Any deficiencies in the installation or performance of a system or component shall be reported in writing to the Contractor and Consultant.
- .3 Equipment settings, including manual damper quadrant positions, manual valve indicators, fan speed control levers, and similar controls and devices shall be physically marked to show final settings.

3.2. JOB SITE INSPECTION

- .1 Inspect the installation of the systems to be tested at least twice during the Construction period. Ensure specified devices and components required for testing and balancing functions have been installed according to the manufacturer's recommendations.
- .2 Ensure all required balancing dampers are installed, functional, and accessible for use in testing and balancing procedures.
- .3 Provide a written report of inspection to the Contractor and Consultant identifying specific concerns and deficiencies affecting the testing and balancing procedures.

3.3. FANS AND AIR HANDLING SYSTEMS

- .1 Verify that all ductwork, dampers, grilles, registers, and diffusers have been installed per design.
- .2 Balance air handling systems at minimum outdoor air quantities. On completion of TAB procedures, retest at maximum outdoor air quantities.
- .3 Test and adjust fan RPM to achieve design flow.
- .4 Test and record motor voltage and amperage. Compare data with nameplate limits.
- .5 Perform pitot tube traverse at all main and branch ducts. Compare traverse total with measured outlet total to determine actual duct leakage.
- .6 Test and adjust minimum outdoor and relief air volumes.
- .7 Test and record system static pressure profile of each air handling system at minimum outdoor air volume. Note coil (i.e. wet/dry) and filter condition of time of testing.
- .8 Test and record entering and leaving air conditions for each heat transfer coil and device. Simulate conditions to achieve winter or summer design parameters.
- .9 Test and record settings of motor thermal overload devices. Adjust settings where required.

3.4. AIR DISTRIBUTION AND TERMINALS

- .1 Adjust duct distribution to obtain specified air quantities. At least one zone balancing damper shall be completely open. Multi diffuser/grille branch ducts shall have at least one volume damper completely open.
- .2 Test and adjust each air terminal to obtain specified flow. Adjust deflectors and pattern controllers to eliminate drafts.

3.5. PRELIMINARY TESTING

- .1 In the event preliminary testing reveals a deficiency in the system which cannot be corrected through the balancing process, advise the Contractor and Consultant in writing describing the conditions and suggested corrective action.

3.6. REPORTS

- .1 Provide TAB report in electronic PDF format for Consultant review.
- .2 Summarize all testing into logical sections, tabulated and summarized.
- .3 Identify system terminals and distribution on legible plan or schematic drawings depicting actual system arrangement. Label pitot tube traverse locations, terminal identification, and equipment identification in a manner consistent with the contract documents.

3.7. REPORT VERIFICATION

- .1 Cooperate with the Consultant in field verification of the final reported valves.
- .2 Specific and random verifications will be performed using the same procedures used in preparation of the reports.
- .3 Sufficient verifications will be performed to satisfy the Consultant that the reports accurately represent the actual system conditions.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install the natural gas piping system indicated on the Drawings and specified in this Section of the Specifications.

1.2. PERSONNEL QUALIFICATIONS

- .1 Install natural gas system only with fitters certified to Ontario Gas Utilization Regulations and CGA requirements.

1.3. GAS SERVICE

- .1 Provide all equipment and materials required for the building natural gas distribution systems in accordance with the requirements of the current version of The Ontario Gas Utilization Regulations.

PART 2 - PRODUCTS

2.1. NATURAL GAS SYSTEM

- .1 Provide complete natural gas system, to CGA requirements.
- .2 Provide pressure reducing, regulating and relief valving required for compatibility between equipment and building natural gas distribution system.

2.2. PIPE

- .1 Steel pipe to ASTM A53/A53M, schedule 40 seamless.

2.3. FITTINGS

- .1 Steel pipe fittings, screwed:
 - .1 Malleable iron, screwed to ANSI B16.3, Class 150 for service pressures up to and including {861 kPa} [125 PSI]
 - .2 Unions: malleable iron, brass to iron, ground seat, to ASTM A47M
 - .3 Nipples: schedule 40 to ASTM A53

2.4. JOINTING MATERIAL

- .1 Screwed fittings: pulverized lead paste
- .2 Welded fittings: to CSA W47.1

.3 Flange gaskets: non-metallic flat.

.4 Brazing: to ASTM B75M

PART 3 - EXECUTION

3.1. INSTALLATION

.1 Install natural gas service to meet CGA, and The Ontario Gas Utilization Regulations and all authorities having jurisdiction.

3.2. DISTRIBUTION

.1 Select pressure reducing valves to maintain downstream pressures within +5% range of setting. Submit sizing data for each valve with Shop Drawings.

.2 Select pressure relief valves for the maximum capacity of the pressure reducing station served plus not less than 25%. Submit sizing data for each valve with Shop Drawings.

.3 Pipe all relief vents individually to outdoors. Size piping for a maximum pressure drop of 10% of the pressure reducing valve setpoint gauge pressure with a 25% capacity safety factor.

.4 Provide upstream and downstream isolating valves and pressure gauges complete with gauge cocks at all pressure reducing stations. Connect relief valves so that they cannot be isolated from the appliances which they serve.

3.3. CONNECTIONS TO EQUIPMENT

.1 Connect gas piping to all gas fired equipment.

3.4. PAINTING

.1 Paint gas service piping to meet code requirements.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply, install and test the heated water piping systems indicated on the Drawings and specified in this Section of the Specifications.
- .3 Install all piping in accordance with CSA B214.07, Installation Code for Hydronic Heating systems.

PART 2 - PRODUCTS

2.1. PIPING, JOINTS, AND FITTINGS

- .1 Meet the following pipe requirements:
 - .1 Pipe: {20 mm} [3/4"] to {50 mm} [2"]: ASTM A53, Standard wall steel electric resistance weld for internal pressure up to {4100 kPa} [600 psi] and ASTM A106 where pressure exceeds {4100 kPa} [600psi]. Fittings and couplings shall be threaded malleable iron meeting ASA B16.3 for pressure classes {1035 kPa} [150 psi] and {2068kPa} [300psi]. Use cast iron meeting ASA B16.4 for pressures classes of {1206 kPa} [175 psi] or {2758 kPa} [400psi].
 - .2 Pipe: {65 mm} [2-1/2"] and larger: Pipe as above, ends bevelled for welding. Fittings and line joints wrought steel meeting ASA B16.9 for welding, or flanged fittings and slip on flanges meeting ASA B16.5. Select pressure classification to meet system working pressures.
- .2 Meet Section 20 05 00 requirements for pipe installation and equipment connection including union and flange provision.
- .3 Provide ASA B16.18, Type L copper take-offs from risers, runouts, and horizontal distribution systems.
- .4 Compression and grooved type fittings will not be accepted.

2.2. VALVES

- .1 For pipe sizes {50 mm} [2"] and smaller, provide ball valves with brass or bronze body, chrome plated solid ball, PTFE seats and seals and full port:
 - .1 soldered - Kitz Figure 59
 - .2 screwed - Kitz Figure 58
- .2 Check valves shall be non-slam type, selected for system operating pressures and temperatures.

- .3 Provide DeZurik plug valves for balancing applications except where circuit balancing valves are specified.
- .4 To {1225 kPa} [175 psig] provide Series 425/118 eccentric plug valve. Equip sizes {12 mm to 100 mm} [½" to 4"] with memory stop and drip cap. Equip valves over {100 mm} [4"] with handwheel gear.
- .5 Provide ball drain valves with cap and chain at base of all hydronic risers. Valve rating- {1750 kPa} [250 psi] at {121°C} [250°F].

2.3. CIRCUIT BALANCING VALVES

- .1 Provide Armstrong Model CBV circuit balancing valves:
 - .1 where shown on the Drawings
- .2 For valves to {50 mm} [2"] provide Model CBVI, Y pattern style, all metal, with soldered or screwed connections, built-in drain connection with shut off valve and protective caps, and integral valve insulation.
- .3 Provide, for each valve:
 - .1 vernier type handwheel settings for precision flow balancing
 - .2 positive shut off valve with no drip seat and plug type stem with teflon disc.
 - .3 tamper proof hidden memory feature
 - .4 positive shut off metering valves with connections for portable meter.
- .4 Select circuit balancing valve size to give a pressure drop at 100% open between {3.0 kPa} [1 ft] and {21 kPa} [7 ft]. Select valves located remote from the pumps in the circuit near minimum pressure drop and those located near the pumps at higher pressure drops.

2.4. SAFETY AND RELIEF VALVES

- .1 Provide safety and relief valves for all closed water systems. Pipe relief to nearest floor drain.
- .2 Provide Watts 174A valves rated at {1035 kPa} [150 psig] at {99oC} [210oF] ASTM rated, cast iron body bronze disc and seat, steel spindle assembly, carbon steel spring.

2.5. AIR VENTS

- .1 Select air vents to suit system operating pressures.
- .2 Provide automatic air vents, Spirax Type 13W to {1035 kPa} [150 psi] and 13WH to {2070 kPa} [300 psi] complete with isolating gate valves at all high points where mains are trapped, where shown in the Drawings and where shown on Typical Detail Sheets. Pipe outlet from each vent to a service sink, drip pan or floor drain.

- .3 Provide manual air vents, screwdriver or key type at each unit heater, cabinet unit heater, convector, wall fin section and fan coil unit.

PART 3 - EXECUTION

3.1. INSTALLATION

- .1 Meet Section 20 05 00 requirements.
- .2 Use valves and strainers of the same size as pipe in which it is installed, unless otherwise indicated.
- .3 Provide circuit balancing valves for throttling or controlling flow in accordance with article 2.2.
- .4 Provide ball valves for shutoff in accordance with article 2.2.
- .5 Install reducing fittings so as not to trap air.
- .6 Provide long radius elbows.
- .7 Provide flanges or unions at connections to all equipment.
- .8 Provide screwed or flanged joints only in accessible locations. Provide access doors as required.
- .9 Do not use field fabricated fittings.
- .10 Equip low points with {20 mm} [3/4"] drain valve piped to floor drain. Provide, at high points on lines and on equipment connections, collection chambers and high-capacity float operated automatic air vents.
- .11 The first hanger on branch take off piping from a riser shall be spring hung to reduce stress on riser and branch.
- .12 Connect branch pipe runouts to top of main distribution pipe.

3.2. TESTING

- .1 Meet testing requirements of all authorities having jurisdiction. Obtain certification and certify tests not required by authorities. Perform not less than the following tests.
- .2 Prove hydronic piping tight under a hydrostatic test of 150% of design working pressure but not less than {700 kPa} [100 psi]. Test without pressure drop for a period of not less than 4 hours.
- .3 Perform tests before piping is covered or concealed.
- .4 Remove all components which will not withstand test pressure and replace after tests.
- .5 Eliminate leaks or remove and refit defective parts. Do not caulk threaded or welded joints.

- .6 After Work is completed, adjust, and put all parts of the system into proper working order. Adjust all valves to achieve specified heating capacities. Leave the complete job ready for regular operation, all to the satisfaction of the Consultant.
- .7 After the testing period, drain the system, and before water treatment is introduced into the system, clean out all dirt pockets and strainers.
- .8 Provide lubricating oils, packing, and other accessories, for proper operation of the system.
- .9 The final test and acceptance shall not be made until the Work is finally completed

3.3. INSTALLATION OF CONTROL DEVICES AND INSTRUMENTATION

- .1 Install all control devices and instrumentation for the hydronic systems as shown on the drawings for items supplied by the controls supplier.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install all pumps for the heating, ventilating and air conditioning systems indicated on the Drawings, and specified in this Section of the Specifications.

1.2. REFERENCE PRODUCTS

- .1 Refer to pump schedule for duty and capacity.

1.3. SELECTION STANDARDS

- .1 Scheduled motor horse powers and pump efficiencies are minimum acceptable. Select motor to ensure non overloading on any part of the pump curve.
- .2 Select pumps so that impeller is no greater than 85% of minimum inside casing diameter.
- .3 Select pumps so that design exit velocity does not exceed {5.5 m/s} [18 fps].
- .4 Select pumps for {1225 kPa} [175 psig] or {1750 kPa} [250 psig] working pressure at maximum operating temperature or as shown on schedule.

1.4. SUBMITTALS

- .1 Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
- .2 Manufacturer's Installation Instructions: Indicate hanging and support requirements and recommendations.
- .3 Millwright's Certificate: Certify that base mounted pumps have been aligned.

1.5. QUALITY ASSURANCE

- .1 Manufacturer: Company specializing in manufacture, assembly, and field performance of pumps with minimum three years' experience.
- .2 Alignment: Align base mounted pumps by qualified millwright.

1.6. REGULATORY REQUIREMENTS

- .1 Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

1.7. PERFORMANCE REQUIREMENTS

- .1 Ensure pumps operate at specified system fluid temperatures without vapour binding and cavitations, are non-overloading in parallel or individual operation, and operate within 25% of midpoint of published maximum efficiency curve.

1.8. EXTRA MATERIALS

- .1 Provide one set of mechanical seals for each pump.
- .2 Provide 2 sets of cartridges for each side-stream filter.

PART 2 - PRODUCTS

2.1. MANUFACTURER

- 1. Contractor shall furnish and install new closed coupled pumps as indicated on the drawings. Pumps shall meet types, sizes, capacities, and characteristics as scheduled on the Equipment Schedule drawings.

2.2. ACCESSORIES:

- .1 Where noted on schedule pumps shall be provided with all iron Construction including cast iron impeller, stainless steel shaft sleeve, and a stainless steel seal assembly housing.

PART 3 - EXECUTION

3.1. FACTORY BENCH TESTS

- .1 Provide results of factory bench tests and incorporate data into operating and maintenance manuals.

3.2. FIELD ALIGNMENT

- .1 Align pumps and motors in the field according to manufacturer's instructions. Have manufacturer check alignment. Realign as necessary to meet manufacturer's requirements.

3.3. START UP

- .1 Have pump manufacturer review site installation before pump start up.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install refrigerant piping systems as indicated on the Drawings and specified in this Section of the Specifications.
- .3 Installation shall be designed and installed by refrigerant piping system specialists.

1.2. SUBMITTAL DATA

- .1 Submit Shop Drawings of refrigerant piping systems and control systems for review prior to commencement of installation.
- .2 Drawings shall include the following:
 - .1 An isometric layout of refrigerant piping showing all piping and components required for the satisfactory operation and maintenance of systems, including but not limited to charging valves, isolating valves, sight glasses, strainers, driers, thermostatic expansion valves, solenoid valves, receivers, relief valves, mufflers, traps, oil separators, and water regulating valves.
 - .2 Control wiring interconnecting air conditioning equipment and refrigerant piping system components.
 - .3 A description of the sequence of operation of the refrigerant piping system.

1.3. REFERENCE STANDARDS

- .1 Meet Division 26 requirements for wiring methods and materials.
- .2 Refrigerant piping design and installation shall conform to the recommendations and requirements of the following:
- .3 CSA Standard B52 - Mechanical Refrigeration Code
- .4 Ontario Building Code
- .5 Air Conditioning and Refrigeration Institute
- .6 Air Conditioning Equipment Manufacturer

PART 2 - PRODUCTS

2.1. PIPING, JOINTS, AND FITTINGS

- .1 Select pipe, fittings, and components to suit systems test and operating pressures.

- .2 Refrigerant piping shall be factory cleaned and sealed, type ACR seamless copper piping. Use only silver brazed joints.
- .3 Use only long radius elbows.
- .4 Size refrigerant piping to attain air conditioning equipment manufacturer's listed cooling capacities.

PART 3 - EXECUTION

3.1. PIPING AND WIRING INSTALLATION

- .1 Keep piping runs and number of elbows and fittings to a minimum.
- .2 Reduce the effect of piping vibration with the use of flexible metal hose.

3.2. DEHYDRATION AND CHARGING

- .1 After installation of piping, a minimum test pressure of {2100 kPa} [300 psi] on the high-pressure side and {1050 kPa} [150 psi] on the low-pressure side shall be placed on the piping system with nitrogen. Pressures shall be maintained without loss for not less than four (4) hours. Repair or replace defective joints.
- .2 After joints have been proven tight under test pressures, achieve a vacuum of not less than {95 kPa} [28" Hg] using a separate vacuum pump. Maintain vacuum without change in pressure for at least twelve (12) hours.
- .3 System shall then be charged with dry refrigerant.
- .4 After charging, recheck all joints with a halide leak detector. Replace any joints found to leak and repeat the above dehydration testing and charging procedures.

3.3. START UP AND ADJUSTMENT

- .1 Provide necessary instruments, gauges and testing equipment required.
- .2 Adjust thermostats, valves and controls and demonstrate that design requirements and equipment manufacturer's ratings have been met.
- .3 Test and record equipment voltage and amperes and compare with motor nameplate data.
- .4 Set and adjust controls to achieve required sequence of operation.

3.4. GUARANTEE

- .1 Replace any refrigerant and oil lost during the warranty period.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install the sheet metal and ductwork systems as indicated on the Drawings and specified in this Section of the Specifications.

1.2. REFERENCE STANDARDS

- .1 Meet Standards described in the latest Edition of HVAC Duct Construction Standards handbook from Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
- .2 Duct dimensions shown on Drawings are net, inside insulation and acoustic duct lining.
- .3 Combination fire and smoke dampers and fire dampers shall be ULC listed and labelled and meet requirements of Ontario Fire Marshall and NFPA-90A.

PART 2 - PRODUCTS

2.1. DUCTWORK

- .1 Fabricate ductwork from galvanized sheet metal with a minimum coating of {1.83 grams/m²} [0.60 oz/sq.ft.] (G60 coating) unless other materials are specifically named. Duct installation shall conform to the following:
 - .1 Ductwork shall be smooth on the inside and free of obstructions, vibration, and rattle.
 - .2 Fabricate ductwork, except as described in the next item, according to the following classifications:
 - .1 Class 1: All ducting subject to positive or negative static pressure of {250 Pa} [1 in wg] or less with maximum velocities of {13 m/s} [2500 fpm] shall be constructed in accordance with SMACNA Construction standards for {250 Pa} [1 in wg] duct.
 - .3 Provide duct transformation with expansion fittings having slopes not exceeding 1 to 7 and contraction fittings having slopes not exceeding 1 to 4.
 - .4 Provide full radius tees, bends, and elbows for changes in direction except where square elbows are required due to space restrictions. Provide DuroDyne double thickness {0.8 mm} [24 gauge] turning vanes assembled in top and bottom rails in square elbows.
 - .5 Provide balancing dampers free to move in either direction without binding or rattling. Construct dampers in ductwork from {1.2 mm} [18 gauge] galvanized

sheet metal. Use manual quadrants on small ducts. On dampers longer than {375 mm} [15"] use push rods with DuroDyne Model SRP ball joints. Use two push rods on ducts wider than {600 mm} [24"]. Provide OBD balancing dampers where shown on the drawings.

- .6 Isolate equipment with DuroDyne neoprene {0.8 mm} [0.032"] thick flexible connectors with finished fabric width not less than {150 mm} [6"].
- .7 Provide {50 mm} [2"] insulated sheet metal blank off panels behind unused portions of exterior louvers.
- .8 Seal all joints in low, medium, and high-pressure ductwork with Transcontinental MP for low and medium pressure or DuroDyne S2 duct sealer for high pressure. Joints shall be sealed to conform to SMACNA standards as follows:

Seal Class	Sealing Required	Static Pressure Construction Class
A	All transverse joints, longitudinal seams, and duct wall penetrations.	{1000 Pa} [4" w.g. and up]
B	All transverse joints and longitudinal seams.	{500-750 Pa} [2" - 3" w.g.]
C	Transverse joints	Up to {500 Pa} [2" w.g.]

- .9 Seal joints in exhaust ducting where fan intake is further than {25 m} [82 ft] from furthest intake in accordance with seal Class A. Similarly seal all exhaust ducting for ETO exhaust, swimming pool and change room systems.
- .2 Construct round ductwork to meet high pressure duct standards and as follows:
 - .1 Provide welded slip joint Construction round duct fittings. Wipe pipe and fittings with Durodyne S-2 duct sealer before assembly. Secure joints with self-tapping screws, then brush again with thick coat of duct sealer.
 - .2 Provide die formed round elbows through {200 mm} [8"] dia. constructed from {1.1 mm} [20 gauge] galvanized steel. Provide 5 section Construction for larger elbows.
 - .3 Provide conical round tees.
- .3 Flexible Ductwork:
 - .1 Provide flexible ductwork upstream and downstream of air terminal control units and/or other locations indicated on the Drawings.
 - .2 Construct ductwork from a tape of soft annealed aluminium sheet, spiral wound into a tube and spiral corrugated to provide strength and flexibility. Provide a

triple mechanical lock to form a continuous secure air joint without the use of adhesives for pressures up to {3000 Pa} [12"].

- .3 Conform to the requirements of NFPA 90 and Underwriters Laboratories classification for round duct to Specification UL 181.

2.2. ACCESS DOORS

- .1 Provide access doors for galvanized ductwork using {0.7 mm} [24 gauge] galvanized material with galvanized mounting frame and {25 mm} [1"] rigid insulation between panels. Provide fastening devices to give tight closure.
- .2 Provide access doors for stainless steel ductwork using {0.61 mm} [24 gauge] stainless steel with stainless steel mounting frame and {25 mm} [1"] rigid insulation between panels. Provide fastening devices to give tight closure.
- .3 Provide access doors for aluminium ductwork of {0.61 mm} [24 gauge] aluminium with aluminium mounting frame, and {25 mm} [1"] rigid insulation between panels. Provide fastening devices to give tight closure.
- .4 Provide access doors and removable panels in plenums and casings of {1.31 mm} [18 gauge] galvanized material with {50 mm} [2"] thickness fiberglass insulation. Equip doors with handles and hinges to open from either side (without risk of injury) as follows:
 - .1 for man doors:
 - .1 handles - Durodyne SP-20
 - .2 hinges - Durodyne HB-3
 - .3 gaskets - Durodyne GN-22
 - .2 for removable panels:
 - .1 sash locks - Durodyne SL-1
 - .2 gaskets - Durodyne GN-22
- .5 Construct all access doors with double panels.
- .6 Provide neoprene gaskets securely formed into door frames around the periphery of all duct access doors.
- .7 Equip door frames for plenums and casings with hollow tubular gaskets. Provide all doors complete with {300 mm x 300 mm} [12" x 12"] viewing ports.
- .8 Provide access doors at all fire dampers.

2.3. ACOUSTIC DUCT LINING

- .1 Provide {25 mm} [1"] thick acoustic duct liner where shown on drawings and as follows:

- .1 Rectangular Duct Liner: Permacote Linacoustic meeting ASTM C 1071 with air surface coated with acrylic coating treated with EPA registered anti-microbial agent proven to resist microbial growth as determined by ASTM G 21 and G 22.
 - .1 Noise Reduction Coefficient: .70 or higher based on "Type A mounting" and tested in accordance to ASTM C 423.
 - .2 Adhesive: meeting ASTM C 916.
 - .3 Fasteners: Duct liner galvanized steel pins welded or mechanically fastened.

2.4. FIRE DAMPERS

- .1 Provide Ruskin curtain or parallel blade type dampers to maintain fire rating integrity of membrane being pierced. Minimum rating to be 1-1/2 hours with {100°C} [212°F] fusible link. Provide multiple dampers where sizes exceed code limitation.
- .2 Provide models as follows, to suit application:

Model No.	Application
IBD-2, Style B or C	Normal duct application (2 hrs.)
IBD-20 Style G	Behind grilles (2 hrs.)
IBDT	In doors or thin separations (2 hrs.)
IBD-23	In fire walls (4 hrs.)
FSF	Behind outlets in fire rated floor (roof) and ceiling assemblies
FD-35	Combination fire and balancing damper (2 hrs.)

- .3 Select dampers with air flow resistance not exceeding {13 Pa} [0.05 in. w.g.] at design flow rates.

PART 3 - EXECUTION

3.1. SHEET METAL INSTALLATION

- .1 Frame and install motorized dampers. Unless shown otherwise, attach each motorized damper module to the channel framing.
- .2 Provide frames in ductwork for airflow stations.
- .3 Provide test openings in all ducts entering and leaving air handling equipment. Install test openings at {150 mm} [6"] intervals across the long dimension of rectangular ducts, and at 90-degree intervals around circular ducts. In insulated surfaces, provide

extension to suit insulation thickness. Provide additional Model IP-4 test ports in ductwork where required for air balancing. Submit drawings to indicate proposed locations.

- .4 Make provisions in ductwork and plenums for installation of duct type smoke detectors and other control devices.
- .5 Provide a stainless-steel skirting around kitchen exhaust ductwork between hood connection and ceiling line where top of hood is below ceiling.
- .6 Slope ductwork down to exhaust hoods and other equipment connections. Provide drains at low points and pipe to nearest floor or funnel drain.
- .7 Provide neoprene isolation gaskets and nylon bolts at connections required for dissimilar metals.
- .8 Seal watertight bottom and sides of intake and exhaust ducts connected to exterior louvers as follows:
 - .1 Intake - from Louvre to air handling unit.
 - .2 Exhaust - from Louvre to {2 metres} [6'-6"] upstream of Louvre.

3.2. ACOUSTIC DUCT LINING INSTALLATION

- .1 Seal all leading and trailing edges and repair all rips or tears of acoustic duct liner with a suitable sealing compound similar to Johns-Manville Superseal.
- .2 Provide a tapered sheet metal nose piece to hold the leading edge of acoustic duct liner and direct the air over the edge.

3.3. TESTING

- .1 Pressure test all ductwork in accordance with the outlines and classification described in the SMACNA, HVAC Duct Leakage Test manual.
- .2 The leakage amount shall not exceed the allotted amount for the pressure class. The test pressures shall be based on the static pressure for each fan.

Duct Construction Class	Leakage Class
{2500 Pa} [10" w.g.]	3
{1500 Pa} [6" w.g.]	6
{1000 Pa} [4" w.g.]	6
{750 Pa} [3" w.g.]	12
up to {500 Pa} [2" w.g.]	12

- .3 Repair duct and retest where air leakage exceeds the specified limits.

-
- .4 Make good all audible leakage, whether test is within limit specified or not.
 - .5 Provide calibrated tester, connection hoses, temporary plugs, etc., as required.
- 3.4. INSTALLATION OF FIRE DAMPERS, SMOKE DAMPERS AND COMBINATION FIRE AND SMOKE DAMPERS
- .1 Install dampers in approved manner suitably anchored to building structure in locations indicated on the Drawings.
 - .2 Install fire dampers complete with sleeve and full perimeter steel angle on both sides of barrier being pierced. Provide manufacturers recommended minimum clearance between masonry or non-combustible frame and sleeve. Sleeve shall accept actual size of damper with blades pocketed outside of air stream.
 - .3 Divide openings into smaller openings using fire resistant structures where openings to be protected require dampers larger than maximum UL listed sizes.
- 3.5. CLEAN UP
- .1 Vacuum clean the inside of all air handling systems, including fans, plenums, ducts, coils, and terminal units to ensure that they are free from debris and dust.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install all fans indicated on the Drawings and specified herein.

1.2. REFERENCE STANDARDS

- .1 Fans to be standard products, selected from published literature of manufacturer.
- .2 Ratings to AMCA for sound and air delivery performance. Provide AMCA seal on each fan.
- .3 Fans shall be factory balanced, statically and dynamically to AMCA Standards.

1.3. SUBMITTAL DATA

- .1 Provide sound and air delivery performance ratings for fans where inlet vanes are provided. Include sound and power data at 100%, 66% and 33% capacity.

1.4. PERFORMANCE REQUIREMENTS

- .1 Refer to Fan Schedule and Drawings for fan sizes, arrangements and capacities.

1.5. GENERAL REQUIREMENTS

- .1 Provide V-belt drives, unless noted otherwise, selected for 200% service factor, based on motor nameplate data. Provide variable pitch motor pulley for motors up to {3.7 kW} [5 HP]. For motors larger than {3.7 kW} [5 HP] provide for at least one drive change to adjust fan speed for site conditions.
- .2 Equip exhaust fans with backdraft dampers unless motorized dampers are provided.

PART 2 - PRODUCTS

2.1. GENERAL

- .1 Refer to the schedule(s) on the drawings.
- .2 Fans shall be ULC listed and labelled.

PART 3 - EXECUTION

3.1. INSTALLATION

- .1 Install fans in accordance with manufacturer's instructions.

- .2 Provide flexible duct connections between each fan and ductwork. Ensure metal bands of connectors are parallel with minimum 1" (25mm) flex between ductwork and fan while running.
- .3 Provide sheaves as required for final air balance.
- .4 Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

3.2. STARTUP AND TESTING

- .1 Have manufacturers check out installed equipment for proper alignment and lubrication at time of start-up.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.

1.2. REFERENCE STANDARDS

- .1 Air handling units shall be standard products, selected from published literature of manufacturer.
- .2 Provide fan ratings based on tests meeting ASHRAE and AMCA procedures and provide only fans carrying the AMCA seals. No fan will be accepted which has a point of rating not listed in the published data or which is not rated for air and sound performance.
- .3 Fans shall be factory balanced, statically and dynamically to AMCA Standards.
- .4 Units shall be designed and constructed to meet the following standards:
 - .1 Air handling fans shall be rated in accordance with AHRI Standard 430ANSI Standard 221.47
 - .2 Air handling coils shall be rated in accordance with AHRI Standard 410. Units shall be provided with certification label affixed to the unit if coils are AHRI 410 certified.
 - .3 CGA, ETLC, CSA or UL/ULC certified for prewired equipment.
 - .4 NRCA Standard for Roof Curbs.
 - .5 NFPA 90A for flame and smoke spread for adhesives.
 - .6 ASHRAE 90.1 - 1989 Standard for energy efficient design of new buildings.

1.3. QUALITY ASSURANCE

- .1 Air Coils: Certify capacities, pressure drops and selection procedures in accordance with current AHRI Standard 410.
- .2 Units will be manufactured to conform to UL 1995 and shall be listed by either UL/CUL or ETL. Units shall be provided with listing agency label affixed to the unit. In the event the unit is not UL/CUL or ETL approved, the contractor shall, at his/her expense, provide for a field inspection by a UL/CUL or ETL representative to verify conformance. If necessary, contractor shall perform modifications to the unit to comply with UL/CUL or ETL as directed by the representative, at no additional expense to the owner.

1.4. SUBMITTALS

- .1 No equipment will be fabricated or delivered until shop drawings have been submitted and reviewed for conformity with the Contract Documents.
- .2 In addition to the requirements of Section 20, submittals shall meet the following standards:
 - .1 All electrical, piping, and ductwork requirements, including sizes, connection locations, and connection method recommendations.
 - .2 Each component of the unit shall be identified, and mechanical Specifications shall be provided for unit and accessories describing Construction, components, and options.
 - .3 All performance data, including capacities and airside and waterside pressure drops, for components.
 - .4 Fan curves shall be provided for fans with the design operating points indicated. Data shall be corrected to actual operating conditions, temperatures, and altitudes.
 - .5 For units utilizing multiple fans in a fan section, a fan curve shall be provided showing the performance of the entire bank of fans at design conditions. In addition, a fan curve shall be provided showing the performance of each individual fan in the bank of fans at design conditions. Also, a fan curve shall be provided showing the performance of the bank of fans, if one fan is down. The percent redundancy of the bank of fans with one fan down shall be noted on the fan curve or in the tabulated fan data.
 - .6 A filter schedule must be provided for each air handling unit supplied by the air handling unit manufacturer. Schedule shall detail unit tag, unit size, corresponding filter section location within the AHU, filter arrangement (e.g. angled/flat), filter depth, filter type (e.g. pleated media), MERV rating, and filter quantity and size.
 - .7 A schedule detailing necessary trap height shall be provided for each air handling unit. Schedule shall detail unit tag, unit size, appropriate trap schematic with recommended trap dimensions, and unit supplied base rail height. Contractor shall be responsible for additional trap height required for trapping and insulation beyond the unit supplied base rail height by adequate housekeeping pad.
 - .8 A coil valve coordination schedule shall be provided for each air handling unit supplied by the air handling unit manufacturer. Schedule shall detail unit tag, coil type and corresponding section location within the AHU, valve style (e.g. global, ball), valve type (e.g. electronic 2-way/3-way), valve position (e.g. normally open/closed), size, flow coefficient (CV), and close-off pressure.
 - .9 An electrical MCA - MOP schedule shall be provided for each electrical circuit to which field-power must be supplied. Schedule to detail unit tag, circuit description, voltage/phase/hertz, Minimum Circuit Ampacity (MCA), and calculated Maximum Overcurrent Protection (MOP).

- .10 Sound data shall be provided using AHRI 260 test methods. Unit discharge, inlet, and radiated sound power levels in dB shall be provided for 63, 125, 250, 500, 1000, 2000, 4000 and 8000Hz.
- .11 Product data shall include dimensions, weights, capacities, certifications, component performance, electrical characteristics, casing Construction details, wiring interconnections, gauges and finishes of materials.
- .12 Submit manufacturer's recommended installation instructions.

1.5. HANDLING AND DELIVERY

- .1 Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- .2 Units shall ship fully assembled up to practical shipping and rigging limitations. Shipping splits shall be clearly defined on submittal drawings. Cost associated with non-conformance to shop drawings shall be the responsibility of the manufacturer. AHU's less than 100-inches wide shall allow for forklift transport and manoeuvrability on the jobsite.
- .3 Deliver units to jobsite with fan motor(s), sheave(s), and belt(s) completely assembled and mounted in units.
- .4 Indoor units shall be shipped in a clear shrink-wrap or stretch-wrap to protect unit from in-transit rain and debris per ASHRAE 62.1 recommendations.
- .5 Installing contractor shall be responsible for storing AHU in a clean, dry place and protect from weather and Construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.6. FACTORY LEAK TESTING

- .1 Unit manufacturer shall pressure test air handling unit to ensure the leakage rate of the casing does not exceed 1.5% of the unit air flow at 1.5 times the minimum calculated internal positive static pressure.
- .2 Test shall be conducted in accordance with SMACNA duct Construction manual. A calibrated orifice shall be used to measure leakage airflow.
- .3 An officer of the manufacturer shall certify test results. Forward copies of certified test results to the consultant.

1.7. PERFORMANCE REQUIREMENTS

- .1 Refer to the Schedules for equipment sizes, arrangements, acoustic performance, and capacities.
- .2 Air conditioning units shall be built to the level of quality as herein specified to ensure the performance of the Air Conditioning Unit based on operating parameters outlined herein.

1.8. START-UP AND OPERATING REQUIREMENTS

- .1 Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters in place, bearings lubricated (if applicable), condensate properly trapped, piping connections verified and leak-tested, belts aligned and tensioned, all shipping braces removed, bearing set screws torqued, and fan has been test run under observation.

1.9. WARRANTY

- .1 Unit manufacturer shall provide, at no additional cost, a standard parts warranty that covers a period of one year from substantial performance or 18 months from shipment, whichever occurs first. This warrants that all products are free from defects in material and workmanship and shall meet the capacities and ratings set forth in the equipment manufacturer's catalogue and bulletins.

PART 2 - PRODUCTS

2.1. GENERAL

- .1 Air Handling Units shall be built to the level of quality as herein specified and to the description of the Air Handling Unit Schedule.
- .2 Substitution of any product other than that specified must ensure no deviation below the stated capacities, air flow rate, heat transfer rate, filtration efficiency and air mixing quality. Power requirements must not be exceeded, and where specifically defined, sound power levels must not be exceeded. Applications for "equal" or "alternate" must address these factors.
- .3 Unless stated otherwise, air-handling units are to be shipped to the job in one piece, factory assembled. Modular units assembled to achieve a close approximation to the intent of this Specification will not be considered equal. All equipment shall where specified and applicable, be pre-wired and factory certified by an approved testing agency such as ETL, UL, or CSA for the destination.
- .4 All electrical circuits shall undergo a dielectric strength test and shall be factory tested and checked as to proper function.
- .5 The air handling units and major components shall be products of manufacturers regularly engaged in the production of such equipment and with a minimum of fifty (50) continuous years of proven production experience.
- .6 Air Handling Units shall be as manufactured by Engineered Air and be base bid. Cost savings must be shown for alternate products, and it must be clearly indicated in all areas where the alternate products do not meet the specified product.

2.2. UNIT CONSTRUCTION

- .1 Unit casing shall be of minimum 18 ga (1.3 mm) satin coat galvanized sheet metal. Surfaces on indoor and outdoor units shall be cleaned with a degreasing solvent to remove oil and metal oxides. Outdoor units shall be primed with a two-part acid based etching primer. All unprotected metal and welds shall be factory coated.
- .2 All exposed surfaces shall have a finish coat of alkyd enamel to all exposed surfaces with an ASTM B117 11 salt spray rating of 500 hrs.

- .3 All walls, roofs, and floors shall be of formed Construction with at least two breaks at each joint. Joints shall be secured by sheet metal screws or pop rivets. Wall and floor joints shall be broken in and on all outdoor unit's roof joints broken out (exposed) for rigidity. All joints shall be caulked with a water-resistant sealant.
- .4 The following components shall be provided with a 22 ga (.85 mm) solid satin coat galvanized metal liner over the following insulated areas: Unit underside, filter sections, inlet, and discharge plenums.
- .5 The following components shall be provided with 24 ga (.70 mm) perforated (40% free area) satin coat galvanized metal liner over the following insulated areas: Fan section.
- .6 Units shall be provided with access doors to the following components: fans, motors, filters, dampers and operators, access plenums, humidifiers/wet cells, electrical control panels and burner/compressor compartments. Access doors shall be as large as practical for easy access. Screwed wall panel access will not be acceptable for the above listed components.
- .7 Units shall be provided with hinged access doors with e-profile gasket, fully lined, and a minimum of two lever handles.
- .8 Hinged access doors open outwards on all sections for outdoors units. Doors located on sections with positive pressure shall have a clear warning label and a safety device must be affixed.
- .9 All units shall be internally insulated with 1" (25 mm) thick, 1 1/2 lb./ft.3 (24 kg/m3) density coated insulation.
- .10 The coated insulation shall be secured to metal panels with a fire-retardant adhesive and welded steel pins at 18" (450 mm) o/c. All longitudinal insulation joints and butt ends shall be covered by a sheet metal break to prevent deterioration of exposed edges. Drain pans and all floor areas shall be insulated on the underside.
- .11 Cooling coil drain pans shall be fabricated of 304 stainless steel and are an integral part of the floor panelling, a minimum of 2" (51 mm) deep with welded corners. Drain pans shall extend a minimum of 6" (152 mm) downstream of coil face and be provided with a 1 1/2" (38 mm) S.S. M.P.T. drain connection. All cooling coil drain pans shall have a fast pan and be sloped and pitched such that there is no standing water. Intermediate drain pans shall be provided where required for effective moisture removal.
- .12 Outdoor units shall be weatherproofed and equipped for installation outdoors. Units shall be fabricated to prevent the infiltration of rain and snow: louvers or hoods shall be provided on air intakes and exhaust openings. Rain gutters or diverters shall be installed over all access doors. All joints shall be caulked with a water-resistant sealant. The roof joints shall be turned up 2" (51 mm) with three break interlocking design and the outer wall panels shall extend a minimum of 1/4" (6 mm) below the floor panels.

- .13 Unit floors shall incorporate welded floor to base Construction. Floors are of three break upstanding design with welded corners and free of penetrations. Unit underside joints shall be caulked.
- .14 The unit shall match existing curbs and openings without the use of a curb adaptor.

2.3. FANS

- .1 Centrifugal fans shall be rated in accordance with AMCA Standard Test Code Bulletin 210. Fan manufacturer shall be a member of AMCA. All fans and fan assemblies shall be dynamically balanced during factory test run. Fan shafts shall be selected for stable operation at least 20% below the first critical RPM. Fan shafts shall be provided with a rust inhibiting coating.
- .2 Single low pressure forward curved fans of 18" (457 mm) diameter or smaller shall be equipped with greaseable pillow block bearings supported on a rigid structural steel frame.
- .3 Single low pressure forward curved fans of 20" (508 mm) diameter or larger shall be equipped with greaseable pillow block bearings supported on a rigid structural steel frame.
- .4 Backward inclined fans with airfoil or flat blade design shall be equipped with greaseable self-aligning ball or roller type pillow block bearings.
- .5 Fans shall be belt driven plenum type configuration where noted in schedules. Thrust restraint isolators shall be provided parallel to the shaft centreline when required to minimize axial movement and bending movements of the blower assembly(s). Drive side bearings on plenum fans shall be adapter style to ensure even clamping of the bearing sleeve to the shaft.
- .6 Provide inlet screen open wire mesh protective discharge screen.
- .7 Fan motor sheaves shall be adjustable with motors 7 1/2 HP (5.6 kW) and smaller. On fans with larger motors, fixed drives shall be provided. All drives shall be provided with a rust inhibiting coating. The air balancer shall provide for drive changes (if required) during the air balance procedure.
- .8 Provide full section return air fan(s) as scheduled. The use of power exhaust propeller type arrangements will not be considered.
- .9 Fan and motor sheaves shall be factory installed, fan balanced, and tested prior to shipment.
- .10 Variable Frequency Drives
 - .1 A pulse width modulated (PWM) inverter designed for use with both asynchronous and permanent magnet motors shall be provided.
 - .2 IEEE 519-2014 is an electrical system standard for harmonic mitigation and not intended to be applied to an individual piece of equipment. Drives are only one of many sources of harmonics; thus, verification of system IEEE 519 2014 compliance is beyond the manufacturer's scope. The EOR (Engineer of

- Record) is responsible for conducting an electrical system study and verifying the drive schedule has specified proper harmonic mitigation for the drives.
- .3 Drives shall be UL labelled as a complete assembly.
 - .4 The base drive shall be SEMI-F47 certified. The drive must tolerate voltage sags to 50% for up to 0.2 seconds, sags to 70% for up to 0.5 seconds, and sags to 80% for up to one second.
 - .5 The drive shall provide full rated output from a line of +10% to -15% of nominal voltage. The drive shall continue to operate without faulting from a line of +25% to -35% of nominal voltage.
 - .6 Multiple home view screens shall be capable of displaying up to 21 points of information.
 - .7 The control panel shall display the following items on a single screen: output frequency, output current, reference signal, drive name, time, and operating mode (Hand vs Auto, Run vs Stop). Bi-colour (red/green) status LED shall be included. Drive (equipment) name shall be customizable.
 - .8 There shall be a built-in time clock. The clock shall have a battery backup with 10 years minimum life span. Daylight savings time shall be selectable.
 - .9 The drive shall automatically backup parameters to its control panel. In addition to the automatic backup, the drive shall allow two additional unique backup parameter sets to be stored. Backup files shall include a time and date stamp. In the event of a drive failure, the control panel of the original drive can be installed on the replacement drive, and parameters from that control panel can be downloaded into the replacement drive.
 - .10 The control panel shall be removable capable of remote mounting.
 - .11 The control panel shall have the ability to store screen shots which are downloadable via USB.
 - .12 All drives shall have the following hardware features/characteristics as standard:
 - .1 Two (2) programmable analogue inputs shall accept current or voltage signals. Current or voltage selection configured via the VFD control panel. Drives that require access to internal components to perform these functions are not acceptable.
 - .2 Two (2) programmable antilog outputs. At least one of the analogue outputs shall be adjustable for current or voltage signal configured via the VFD control panel. Drives that require access to internal components to perform these functions are not acceptable.
 - .3 Six (6) programmable digital inputs. All digital inputs shall be programmable to support both active high and active low logic and shall include adjustable on/off time delays. The digital input shall be capable of accepting both 24 VDC and 24 VAC.

- .4 Three (3) programmable form-C relay outputs. The relay outputs shall include programmable on/off time delays. The relays shall be rated for a continuous current rating of 2 amps and maximum switching voltage of 250 VAC / 30 VDC. Open collector and Form-A relays are not acceptable. Drives that have less than (3) Form-C relay outputs shall provide an option card to provide additional relay outputs.
- .5 Drive terminal blocks shall be colour coded for easy identification of function.
- .6 The drive shall include an isolated USB port for interface between the drive and a laptop. A non-isolated USB port is not acceptable.
- .7 An auxiliary power supply rated at 24 VDC, 250 mA shall be included.
- .8 At a minimum, the drives shall have internal impedance equivalent to 5% to reduce the harmonics to the power line. 5% impedance may be from dual (positive and negative DC link) chokes or AC line reactor. Drives with only one DC link choke shall add an AC line choke integral to the drive enclosure.
- .9 The drive shall have cooling fans that are designed for field replacement. The primary cooling fan shall operate only when required and be variable speed for increased longevity and lower noise levels. Drives whose primary cooling fans are not variable speed shall include a spare cooling fan.
- .10 The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds every minute. The minimum current rating shall meet or exceed the values in the NEC/UL table 430.250 for 4-pole motors.
- .11 The input current rating of the drive shall not be greater than the output current rating.
- .12 Circuit boards shall be coated per IEC 60721-3-3, chemical gasses class 3C2 and solid particles class 3S2.
- .13 Earth (ground) fault detection shall function in both modulating (running) and non-modulating modes.
- .14 Coordinated AC transient surge protection system consisting of 4 MOVs (phase-to-phase and phase-to-ground), a capacitor clamp, and internal chokes. The MOVs shall comply with UL 1449 4th edition. Drives that do not include coordinated AC transient surge protection shall include an external TVSS/SPD (Transient Voltage Surge Suppressor/Surge Protection Device).
- .15 The drive shall include a robust DC bus to provide short term power-loss ride through. The DC bus Joule to drive kVA ratio shall be 4.5 J/kVA or higher. An inertia-based ride through function should help

maintain the DC bus voltage during power loss events. Drives with control power ride through only are not acceptable.

- .13 All drives shall have the following software features as standard:
 - .1 A Fault Logger that stores the last 16 faults in non-volatile memory. The most recent 5 faults save at least 9 data points including but not limited to: Time/date, frequency, DC bus voltage, motor current, DI status, temperature, and status words. The date and time of each fault and fault reset attempt shall be stored in the Fault Logger.
 - .2 An Event Logger that stores the last 16 warnings or events that occurred in non-volatile memory. Events shall include, but not limited to warning messages, checksum mismatch, run permissive open, start interlock open, and automatic reset of a fault. The date and time of each event's start and completion points shall be stored in the Event Logger.
 - .3 Programmable start method. Start method shall be selectable based on the application: flying-start, normal-start, and brake-on-start.
 - .4 Programmable loss-of-load (broken belt / coupling) indication. Indication shall be selectable as a control panel warning, relay output, or over network communications. This function to include a programmable time delay to eliminate false loss-of-load indications.
 - .5 Motor heating function to prevent condensation build up in the motor. Motor heating adjustment, via parameter, shall be in "Watts." Heating functions based only on "percent current" are not acceptable.
 - .6 Advanced power metering abilities shall be included in the drive. Drives without these data points must include a separate power meter with each drive.
 - .1 Instantaneous output power (kW)
 - .2 Total power broken down by kWh, MWh, and GWh units of measurement. Power meters that only display kWh and roll over or "max out" once the maximum kWh value is reached are not acceptable. There shall be resettable and non-resettable total power meters within the drive.
 - .3 Time based kWh metering for: current hour, previous hour, current day, and previous day.
 - .4 Energy saving calculation shall be included that shows the energy and dollars saved by the drive.
 - .7 The drive shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and reduce audible motor noise.

- .8 External fault circuit – three separate external fault inputs shall be provided. This circuit shall have the same features and functionality as the start interlock circuit except it shall require a manual reset before the drive is allowed to operate the motor.
- .9 The drive shall include a switching frequency control circuit that reduces the switching frequency based on actual drive temperature and allows higher switching frequency settings without derating the drive. It shall be possible to set a minimum and a target switching frequency.
- .10 The ability to automatically restart after an over-current, over-voltage, under-voltage, external fault, or loss of input signal protective trip. The number of restart attempts, trial time, and time between attempts shall be programmable. Each of these faults may have automatic restart individually disabled via a parameter selection.
- .11 Three (3) programmable critical frequency lockout ranges to prevent the drive from operating the load continuously at an unstable speed/load.
- .12 Seven (7) programmable preset frequencies/speeds.
- .13 Two independently adjustable accel and decel ramps with 1 – 1800 seconds adjustable time ramps.
- .14 At least 4 parameter user sets that can be saved to the permanent memory and recalled using a digital input, timed function, or supervision function.
- .15 Drive shall be compatible with an accessory that allows the control board to be powered from an external 24 VDC/VAC source allowing the drive control to remain powered by a UPS during an extended power outage.
- .16 The drive shall include a fireman's override mode. Upon receipt of a contact closure from the Fire Alarm Life Safety system, the drive shall operate in a dedicated override mode distinct and separate from the drive's normal operation mode. The following features will be available in the drive override function:
 - .1 The override mode shall be secured by password to prevent changes once programmed.
 - .2 The drive shall ignore external inputs and commands not defined as part of the override function.
 - .3 Override operation mode shall be selectable between single frequency, multiple fixed frequencies, follow an analogue input signal, PID control, or come to a forced stop.

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- .4 High priority safeties shall stop the drive and lower priority safeties shall be ignored in override mode.
 - .5 Drive faults shall be defined in critical and low priority groups. Critical faults shall stop the drive. Low priority faults shall be reset. Reset trials and timing shall be programmable.
 - .6 The drive shall be configurable to receive from 1 to 3 discrete digital input signals and operate at up to three discrete speeds.
- .14 Security Features
- .1 The drive shall include password protection against parameter changes.
 - .2 There shall be multiple levels of password protection including end user, service, advanced, and override.
 - .3 The drive shall support a customer generated unique password between 0 and 99,999,999.
 - .4 The drive shall log an event whenever the drive password has been entered.
 - .5 The drive shall provide a security selection that prevents any “back door” entry. This selection even prevents the drive manufacturer from being able to bypass the security of that drive.
 - .6 A security level shall be available that prevents the drive from being flashed with new firmware.
- .15 Network Communications
- .1 The drive shall have an EIA-485 port with removable terminal blocks. The onboard protocols shall be BACnet MS/TP, Modbus, and Johnson Controls N2. Optional communication cards for BACnet/IP, LonWorks, Profibus, Profinet, EtherNet/IP, Modbus TCP, and DeviceNet shall be available. The use of third-party gateways are not acceptable.
 - .2 The drive shall have the ability to communicate via two protocols at the same time, one onboard protocol, and one option card-based protocol. Once installed, the drive shall automatically recognize any optional communication cards without the need for additional programming.
 - .3 The drive shall not require a power cycle after communication parameters have been updated.
 - .4 The embedded BACnet connection shall be a MS/TP interface. The drive shall be BTL listed to revision 14 or later. Use of non-BTL listed drives are not acceptable.

- .5 The drive shall be classified as an Applications Specific Controller (B ASC). The interface shall support all BIBBs defined by the BACnet standard profile for a B-ASC including, but not limited to:
 - .1 Data sharing: read property Multiple-B, write property Multiple B, COV-B
 - .2 Device management: Time synchronization-B
 - .3 Object type support: MSV, Loop
- .6 The drive's relay output status, digital input status, analogue input/output values, hand-auto status, warning, and fault information shall be capable of being monitored over the network. The drive's start/stop command, speed reference command, relay outputs, and analogue outputs shall be capable of being controlled over the network. Remote drive fault reset shall be possible.
- .16 Unit mounted manual VFD bypass switch shall lock out VFD. Fan shall run on maximum set volume. Bypass switch and all interlock contacts are factory mounted and pre-wired.
- .17 Load reactors shall be provided for all 575-volt applications.
- .18 Drive(s) shall be factory supplied and installed.
- .19 Minimum air flow rate of 50% CFM on hybrid air source heat pump systems.
- .11 Motor, fan bearings, and drive sheaves assembly shall be located inside the fan plenum to minimize bearing wear and to allow for internal vibration isolation of the fan-motor assembly where required. Motor mounting shall be adjustable to allow for variations in belt tension.
- .12 Fan-motor assemblies shall be provided with vibration isolators. Isolators shall be bolted to steel channel welded to unit floor that is welded to the structural frame of the unit. Use of separate bumpers or snubbers are not acceptable. Fans shall be attached to the discharge panel by a polyvinyl chloride coated polyester woven fabric with a sealed double locking fabric to metal connection.
- .13 The isolators shall be neoprene-in-shear type for single 9" (230 mm) to 15" (380 mm) diameter forward curve fans.
- .14 All forward curve fans 18" (457mm) in diameter and larger and all backward inclined fans shall incorporate vertical spring isolators with levelling bolts and bridge bearing waffled pads with minimum 1" (25 mm) static deflection designed to achieve high isolation efficiency.
- .15 Plenum fans shall incorporate vertical spring isolators with levelling bolts and bridge bearing waffled pads with minimum 1" (25 mm) static deflection designed to achieve high isolation efficiency. Thrust restraints shall be provided to minimize axial movement of the fan assembly.
- .16 Fan motors shall be ODP (open drip proof) high type.

2.4. COILS

- .1 Coils shall have 3/8" O.D. diameter tubes as manufactured by Engineered Air and constructed of tube, aluminum fin, and galvanized casing.
- .2 Fins constructed of aluminum or copper shall be corrugated for maximum heat transfer and shall be mechanically bonded to the tubes by mechanical expansion of the tubes. The coils shall have a galvanized steel casing. All hydronic and DX refrigerant coils shall be factory tested with air at 300 psig (2068 kPa) while immersed in an illuminated water tank. All condenser refrigerant coils shall be factory tested with air at 650 psig (4482 kPa) while immersed in an illuminated water tank.
- .3 Hydronic and DX refrigerant coils shall be circuited to provide adequate tube velocities to meet design requirements. Internal turbulators are not acceptable.
- .4 Multiple row coils shall be of staggered tube design circuited to optimize capacity with minimum pressure drop.
- .5 Refrigerant evaporator type coils shall be equipped with distributors connected to the coil by copper tubes. When a condensing unit is supplied by Engineered Air and a hot gas bypass valve is required, a 5/8" (16 mm) O.D. spigot will be provided at the top of the suction header.
- .6 Refrigerant coils with multiple compressors shall be alternate tube circuited in order to distribute the cooling effect over the entire coil face at reduced load conditions.

2.5. ELECTRIC HEAT

- .1 Electric resistance heaters shall be provided in the capacities, voltage, and steps of control as noted in the Schedules and shall bear a listing or certification mark from an authorized agency.
- .2 Heater elements shall be installed a minimum of 12" (305 mm) downstream from air filters.
- .3 Heater element wiring shall terminate in a full height enclosure at one end of the heater. All internal wiring shall terminate on clearly identified terminal blocks. A wiring diagram shall be provided on the enclosure cover.
- .4 Heaters shall be equipped with an automatic reset disc type thermal cut-out.
- .5 Heater elements shall be open type nickel-chromium Construction (60% Ni, 15% Cr, 25% Fe). Coil terminal pins shall be mechanically secured and insulated from the frame by means of non-rotating ceramic bushings.
- .6 Heating coil casings shall be galvanized steel of suitable gauge as required.
- .7 Heaters to be supplied with protective screens on inlet and outlet sides.
- .8 Electric Heat Control shall be complete with The CenCon shall provide 0-10VDC signal to an SCR with proportional and integral control and discharge air sensor to maintain set point temperature and provide rapid response to incremental changes in the discharge air temperature.

- .1 Silicon Controlled Rectifier (SCR) performing time-based sine wave phase control. The SCR shall be controlled by a factory installed proportional integral controller. The control system may be augmented by step and/or ambient controls. The SCR shall be controlled by electronic modulating discharge air control.

2.6. FILTERS

- .1 Filter sections shall be provided with adequately sized access doors to allow easy removal of filters. Filter removal shall be from one side of the unit as noted on the drawings.
- .2 The filters shall be designed to slide out of the unit. Side removal filters shall slide into a formed metal track sealing against metal spacers at each end of the
- .3 4" (100 mm) Extended Media (Pleated) Disposable Filters: Filters shall be extended surface pleated complete with 100% synthetic media that does not support microbial growth. Frame shall be a high wet strength beverage board with a cross-member design that increases filter rigidity and prevent breaching. Frame shall be recyclable. Filters shall have an expanded metal support grid bonded to the air-exiting side of the filter to maintain pleat uniformity and prevent fluttering. Metal support grid shall be recyclable. The filters shall be MERV 13 per ASHRAE 52.2. and rated U.L. 900 Class II. A permanent re-usable metal enclosing frame shall be provided for side loaded applications.
- .4 Provide filter bank with unit mounted Dwyer 2000 Magnehelic air filter gauge complete with aluminum tubing. Filter gauge to have a range of to 2"WC (0 500 Pa). Where two or more filter banks are connected to a single gauge, a multiple gauge kit with manual shut-off cocks in the air tubing shall be provided.
- .5 Where the filter gauges are provided on outdoor units, they shall be flush or exterior mounted inside of a weatherproof enclosure.

2.7. DAMPERS

- .1 Dampers shall be extruded aluminum low leak airfoil Tamco Series 1000 for the return air stream & extruded aluminum, low leak, insulated blade Tamco Series 9000 for outside air stream.
- .2 Mixing dampers shall be parallel blade type.
- .3 Gravity relief dampers shall be single blade design type.
- .4 Mixing box controls shall be complete with The CenCon shall be complete with proportional and integral control with a temperature sensor to maintain set point temperature and provide rapid response to incremental changes in discharge air temperature.
 - .1 The controller shall provide economizer control c/w minimum position from 0-10VDC signal by others.
 - .2 Automatic high ambient set back shall be provided. The ambient enthalpy shall be compared to the return air enthalpy.

- .3 The economizer shall be disabled above 65°F (18°C) ambient temperature.
- .4 Damper actuator position feedback shall be provided.

2.8. MECHANICAL HEATING & COOLING

- .1 Compressors shall be hermetic scroll type set on resilient neoprene mounts. The compressors shall incorporate an internal or external pressure-limiting device to protect the compressor in the event of overpressure. Compressors shall be provided with a means of overload protection. External crankcase heaters shall be locked out during compressor operation.
- .2 Compressors shall be complete with service valves.
- .3 Air Cooled Condenser
 - .1 Condenser coils shall be copper tube type, mechanically expanded into aluminum fins. Coils shall be factory pressure tested with air while immersed in an illuminated water tank.
 - .2 Condenser fans shall be direct drive propeller type arranged for vertical draw through airflow. Motors shall be weather resistant type with integral overload protection and designed for vertical shaft condenser fan applications. Fan and motor assemblies shall be mounted in a venturi for optimum efficiency with minimum noise level.
 - .3 Condenser fans shall be fully housed fan with protective screen and fluted blades for optimum efficiency with minimum noise level.
 - .4 Condenser section to form an integral part of the unit.
- .4 Packaged Air Source Heat pump
 - .1 The entire package including fan controls, head pressure control, and all other miscellaneous controls and accessories shall be pre-wired, and factory certified by an approved testing agency such as ETL, UL, or CSA for the destination.
 - .2 Unit must conform to regulations set out in the Canadian Energy Efficiency Act for large air conditioners. Packaged units shall be tested to CSA Standard C746-17 and must bear an EEV (energy efficiency verification) label provided by CSA.
 - .3 The entire package including fan controls, head pressure control, and all other miscellaneous controls and accessories shall be pre-wired, and factory certified by an approved testing agency such as ETL, UL, or CSA for the destination.
 - .4 The equipment shall operate in cooling down to 50°F (10°C) ambient temperature for mixed air and 58°F (14.4°C) ambient temperature for make-up-air applications. The equipment shall operate in heating down to 0°F (-17.8°C) (RTU-1) and 5°F (-15°C) (RTU-2) operation. Where applicable, multiple refrigeration circuits shall be separate from each other. Refrigeration

circuits shall be complete with electronic expansion valves, sight glass, liquid line filter-driers, and service ports fitted with Schrader fittings. Equipment shall have condensers designed for 15°F (8°C) liquid sub-cooling. The complete piping system shall be purged, and pressure tested with dry nitrogen, then tested again under vacuum. Each system shall be factory run and adjusted prior to shipment.

- .5 Packaged units shall be supplied with R-410A refrigerant.
 - .6 Controls for hermetic compressor units shall include compressor and condenser fan motor contactors, supply fan contactors and overload protection, control circuit transformer, cooling relays, ambient compressor lockout, anti-short cycle and inter stage timers, and automatic reset low pressure controls. Compressors over 6 tons (21 kW) shall be complete with manual reset high pressure controls. Head pressure actuated fan cycling control shall be provided on all multiple condenser fan units.
 - .7 Provide hot gas bypass on the lead compressor to provide freeze protection in the event of low loads.
 - .8 Compressors shall be located on the side of the unit in a service enclosure complete with hinged access doors c/w lever handles for ease of service.
 - .9 Each circuit to have suction accumulators, and receivers so ensure proper operation.
 - .10 Provide low ambient heating operation to 0°F (-17.8°C) (RTU-1) and 5°F (-15°C) (RTU-2) operation.
- .5 Air source heat pump Heating & Cooling Control
- .1 The Cencon controller shall be complete with proportional and integral control with a discharge air sensor to maintain set point temperature and provide rapid response to incremental changes in discharge air temperature.
 - .1 The controller shall provide 3 to 4 stages of mechanical cooling, and 3 to 4 stages of mechanical heating.
 - .2 The controller shall have built-in minimum run time and anti-cycle timers.
 - .3 Mechanical cooling shall be disabled below a fixed low ambient temperature setpoint. Mechanical heating shall be locked out below 17F. At this temperature, the gas heating section shall provide the required discharge air temperature.
 - .4 Cooling enable/disable shall be through controller demand.

2.9. FACTORY SUPPLIED CONTROLS/WIRING

- .1 Provide a system of motor control, including all necessary terminal blocks, motor contactors, motor overload protection, grounding lugs, control transformers, auxiliary contactors, and terminals for the connection of external control devices or relays.

- .2 Gas fired units shall also include high limit and combustion airflow safeties.
- .3 Electric heat units shall include fan access door switch (to shut heater off when door is opened), auxiliary high limit, airflow switch, and heating contactors.
- .4 Fire alarm circuits (where required) shall be powered from a relay in unit circuitry.
- .5 Factory installed and wired non-fused disconnect switch in NEMA type 3R weatherproof configuration.
- .6 Controls shall be housed in a control panel mounted in or on the unit that will meet the standard of the specific installation.
- .7 Provide a discharge air low limit equipped with an automatic by-pass time delay to allow for cold weather start-up. On a heating system failure, this device will shut down the fan and close the outdoor air damper.
- .8 CenCon
 - .1 The controller shall be ETL and BTL certified.
 - .2 A graphic OLED display module shall provide temperatures and status of the equipment.
 - .3 The controller shall have a 9-button keypad for navigation of screens.
 - .4 The controller shall have a computer connection diagnostic via Ethernet complete with web-based interface.
 - .5 The controller shall have 4 distinct modes (heating, economizer, ventilation, and cooling). Each mode change is determined by the demand of the system.
 - .6 Minimum operating ambient temperature shall be -40°F (-40°C).
 - .7 The controller shall provide continuous ambient temperature sensing.
 - .8 Self-check on start-up shall be provided to ensure air proving and all sensors are operating within design tolerances.
 - .9 The controller shall have non-recycling auto by-pass low limit with alarm contacts.
- .9 Temperature control shall be discharge air c/w 0-10VDC reset.

PART 3 - EXECUTION

3.1. FIELD EXAMINATION

- .1 The Contractor shall verify that the mechanical room is ready to receive Work, and the opening dimensions are as indicated on the shop drawings and contract documents.

- .2 The Contractor shall verify that the proper power supply is available prior to starting of the fans.

3.2. INSTALLATION

- .1 The Contractor shall be responsible to coordinate ALL of their installation requirements with the Owner and the Owner's selected Mechanical Contractor to ensure that a complete installation for each unit is being provided. Coordination efforts shall include such items as unloading and hoisting requirements, field wiring requirements, field piping requirements, field ductwork requirements, requirements for assembly of field-bolted or welded joints, and all other installation and assembly requirements.

- .2 The AHU manufacturer shall provide all screws and gaskets for joining sections in the field.

- .3 The Contractor shall verify that the following items have been completed prior to scheduling the AHU manufacturer's final inspection and start up:

- .1 All isolated components have had their shipping restraints removed, and the components have been leveled.
- .2 On all field-joined units, that all interconnections have been completed, i.e., electrical and control wiring, piping, casing joints, bolting, welding, etc.
- .3 All water and steam piping connections have been completed and hydrostatically tested and all water flow rates have been set in accordance with the capacities .
- .4 All ductwork connections have been completed and all ductwork has been pressure tested for its intended service.
- .5 All power wiring, including motor starters and disconnects, serving the unit has been completed.
- .6 All automatic temperature and safety controls have been completed.
- .7 All dampers are fully operational.
- .8 All shipping materials have been removed.
- .9 Clean filter media has been installed in the units.

3.3. LEVELLING

- .1 The Contractor shall level all unit sections in accordance with the unit manufacturer's instructions. The Mechanical Contractor shall provide and install all necessary permanent shim material to ensure individual sections and entire assembled units are level.

3.4. STARTUP AND TESTING

- .1 Include all costs for site review for factory technician of equipment installation and management of equipment startup operations, including:
 - .1 Provide a complete and thorough inspection and adjustment prior to startup.
 - .2 Remove all grease from bearings and recharge the bearings with the proper amount and type of lubricant.
 - .3 Check alignment of bearings, drives, motors and be responsible for all proper adjustments. Notify Consultant to coordinate site visit at time of startup.
- .2 Provide copy of startup log to Owner and demonstrate operation and maintenance to Owner's representative. Include for two non-consecutive days of classroom training sessions which shall include presentations by equipment manufacturers' representatives.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply, install and test complete indirect natural gas fired make-up air units as indicated on the drawings and specified in this section of the Specifications.

1.2. QUALITY ASSURANCE

- .1 Unit shall be constructed in accordance with CSA C22.2 and UL 1812 and shall carry the UL (CUL) or ETL (CETL) label of approval.
- .2 Unit shall be constructed in accordance with industrial design practices.
- .3 Insulation shall comply with NFPA90A requirements for flame spread and smoke generation.
- .4 Airflow data shall comply with AMCA 210 method of testing.
- .5 Cabinet and exterior components shall be tested and certified weatherproof.
- .6 All units shall be 100% factory tested with a QA checklist available upon request conforming to Submittal Drawings.

1.3. DELIVERY, STORAGE, AND HANDLING

- .1 Heater will be stored to secure against damage and handled per manufacturer's recommendations.

PART 2 - PRODUCTS

2.1. GENERAL

- .1 Air Handling Units shall be built to the level of quality as herein specified and to the description of the Air Handling Unit Schedule.
- .2 Substitution of any product other than that specified must ensure no deviation below the stated capacities, air flow rate, heat transfer rate, filtration efficiency and air mixing quality. Power requirements must not be exceeded, and where specifically defined, sound power levels must not be exceeded. Applications for "equal" or "alternate" must address these factors.
- .3 Unless stated otherwise, air-handling units are to be shipped to the job in one piece, factory assembled. Modular units assembled to achieve a close approximation to the intent of this Specification will not be considered equal. All equipment shall where specified and applicable, be pre-wired and factory certified by an approved testing agency such as ETL, UL, or CSA for the destination.

- .4 All electrical circuits shall undergo a dielectric strength test and shall be factory tested and checked as to proper function.
- .5 The air handling units and major components shall be products of manufacturers regularly engaged in the production of such equipment and with a minimum of fifty (50) continuous years of proven production experience.
- .6 Air Handling Units shall be as manufactured by Engineered Air and be base bid. Cost savings must be shown for alternate products, and it must be clearly indicated in all areas where the alternate products do not meet the specified product.

2.2. UNIT CONSTRUCTION

- .1 Unit casing shall be of minimum 18 ga (1.3 mm) satin coat galvanized sheet metal. Surfaces on indoor and outdoor units shall be cleaned with a degreasing solvent to remove oil and metal oxides. Outdoor units shall be primed with a two-part acid based etching primer. All unprotected metal and welds shall be factory coated.
- .2 All exposed surfaces shall have a finish coat of alkyd enamel to all exposed surfaces with an ASTM B117-11 salt spray rating of 500 hrs.
- .3 All walls, roofs, and floors shall be of formed Construction with at least two breaks at each joint. Joints shall be secured by sheet metal screws or pop rivets. Wall and floor joints shall be broken in and on all outdoor units roof joints broken out (exposed) for rigidity. All joints shall be caulked with a water resistant sealant.
- .4 The following components shall be provided with a 22 ga (.85 mm) solid satin coat galvanized metal liner over the following insulated areas: Unit underside, filter sections, inlet and discharge plenums.
- .5 The following components shall be provided with 24 ga (.70 mm) perforated (40% free area) satin coat galvanized metal liner over the following insulated areas: Fan section.
- .6 Units shall be provided with access doors to the following components: fans, motors, filters, dampers and operators, access plenums, humidifiers/wet cells, electrical control panels and burner/compressor compartments. Access doors shall be as large as practical for easy access. Screwed wall panel access will not be acceptable for the above listed components.
- .7 Units shall be provided with hinged access doors with hinged access doors with e-profile gasket, fully lined, and a minimum of two lever handles.
- .8 Whenever possible, hinged access doors to areas of negative pressure shall open out, and to areas of positive pressure shall open in. Where space constraints require the use of outward opening doors to an area of positive pressure, a clear warning label and safety device must be affixed.
- .9 All units shall be internally insulated with 1" (25 mm) thick, 1 1/2 lb./ft.³ (24 kg/m³) density coated insulation.
- .10 The coated insulation shall be secured to metal panels with a fire retardant adhesive and welded steel pins at 18" (450 mm) o/c. All longitudinal insulation joints and butt

ends shall be covered by a sheet metal break to prevent deterioration of exposed edges. Drain pans and all floor areas shall be insulated on the underside.

2.3. FANS

- .1 Centrifugal fans shall be rated in accordance with AMCA Standard Test Code - Bulletin 210. Fan manufacturer shall be a member of AMCA. All fans and fan assemblies shall be dynamically balanced during factory test run. Fan shafts shall be selected for stable operation at least 20% below the first critical RPM. Fan shafts shall be provided with a rust inhibiting coating.
- .2 Single low pressure forward curved fans of 18" (457 mm) diameter or smaller shall be equipped with greaseable pillow block bearings supported on a rigid structural steel frame.
- .3 Single low pressure forward curved fans of 20" (508 mm) diameter or larger shall be equipped with greaseable pillow block bearings supported on a rigid structural steel frame.
- .4 Fan motor sheaves shall be adjustable with motors 7 1/2 HP (5.6 kW) and smaller. On fans with larger motors, fixed drives shall be provided. All drives shall be provided with a rust inhibiting coating. The air balancer shall provide for drive changes (if required) during the air balance procedure.
- .5 Fan and motor sheaves shall be factory installed, fan balanced, and tested prior to shipment.
- .6 Variable Frequency Drives
 - .1 A pulse width modulated (PWM) inverter designed for use with both asynchronous and permanent magnet motors shall be provided.
 - .2 IEEE 519-2014 is an electrical system standard for harmonic mitigation and not intended to be applied to an individual piece of equipment. Drives are only one of many sources of harmonics; thus, verification of system IEEE 519-2014 compliance is beyond the manufacturer's scope. The EOR (Engineer of Record) is responsible for conducting an electrical system study and verifying the drive schedule has specified proper harmonic mitigation for the drives.
 - .3 Drives shall be UL labeled as a complete assembly.
 - .4 The base drive shall be SEMI-F47 certified. The drive must tolerate voltage sags to 50% for up to 0.2 seconds, sags to 70% for up to 0.5 seconds, and sags to 80% for up to one second.
 - .5 The drive shall provide full rated output from a line of +10% to -15% of nominal voltage. The drive shall continue to operate without faulting from a line of +25% to -35% of nominal voltage.
 - .6 Multiple home view screens shall be capable of displaying up to 21 points of information.

- .7 The control panel shall display the following items on a single screen: output frequency, output current, reference signal, drive name, time, and operating mode (Hand vs Auto, Run vs Stop). Bi-color (red/green) status LED shall be included. Drive (equipment) name shall be customizable.
- .8 There shall be a built-in time clock. The clock shall have a battery backup with 10 years minimum life span. Daylight savings time shall be selectable.
- .9 The drive shall automatically backup parameters to its control panel. In addition to the automatic backup, the drive shall allow two additional unique backup parameter sets to be stored. Backup files shall include a time and date stamp. In the event of a drive failure, the control panel of the original drive can be installed on the replacement drive, and parameters from that control panel can be downloaded into the replacement drive.
- .10 The control panel shall be removable capable of remote mounting.
- .11 The control panel shall have the ability to store screen shots which are downloadable via USB.
- .12 All drives shall have the following hardware features/characteristics as standard:
 - .1 Two (2) programmable analog inputs shall accept current or voltage signals. Current or voltage selection configured via the VFD control panel. Drives that require access to internal components to perform these functions are not acceptable.
 - .2 Two (2) programmable analog outputs. At least one of the analog outputs shall be adjustable for current or voltage signal configured via the VFD control panel. Drives that require access to internal components to perform these functions are not acceptable.
 - .3 Six (6) programmable digital inputs. All digital inputs shall be programmable to support both active high and active low logic and shall include adjustable on/off time delays. The digital input shall be capable of accepting both 24 VDC and 24 VAC.
 - .4 Three (3) programmable form-C relay outputs. The relay outputs shall include programmable on/off time delays. The relays shall be rated for a continuous current rating of 2 amps and maximum switching voltage of 250 VAC / 30 VDC. Open collector and Form-A relays are not acceptable. Drives that have less than (3) Form-C relay outputs shall provide an option card to provide additional relay outputs.
 - .5 Drive terminal blocks shall be color coded for easy identification of function.
 - .6 The drive shall include an isolated USB port for interface between the drive and a laptop. A non-isolated USB port is not acceptable.

- .7 An auxiliary power supply rated at 24 VDC, 250 mA shall be included.
- .8 At a minimum, the drives shall have internal impedance equivalent to 5% to reduce the harmonics to the power line. 5% impedance may be from dual (positive and negative DC link) chokes or AC line reactor. Drives with only one DC link choke shall add an AC line choke integral to the drive enclosure.
- .9 The drive shall have cooling fans that are designed for field replacement. The primary cooling fan shall operate only when required and be variable speed for increased longevity and lower noise levels. Drives whose primary cooling fans are not variable speed shall include a spare cooling fan.
- .10 The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds every minute. The minimum current rating shall meet or exceed the values in the NEC/UL table 430.250 for 4-pole motors.
- .11 The input current rating of the drive shall not be greater than the output current rating.
- .12 Circuit boards shall be coated per IEC 60721-3-3, chemical gasses class 3C2 and solid particles class 3S2.
- .13 Earth (ground) fault detection shall function in both modulating (running) and non-modulating modes.
- .14 Coordinated AC transient surge protection system consisting of 4 MOVs (phase-to-phase and phase-to-ground), a capacitor clamp, and internal chokes. The MOVs shall comply with UL 1449 4th edition. Drives that do not include coordinated AC transient surge protection shall include an external TVSS/SPD (Transient Voltage Surge Suppressor/Surge Protection Device).
- .15 The drive shall include a robust DC bus to provide short term power-loss ride through. The DC bus Joule to drive kVA ratio shall be 4.5 J/kVA or higher. An inertia-based ride through function should help maintain the DC bus voltage during power loss events. Drives with control power ride through only are not acceptable.
- .13 All drives shall have the following software features as standard:
 - .1 A Fault Logger that stores the last 16 faults in non-volatile memory. The most recent 5 faults save at least 9 data points including but not limited to: Time/date, frequency, DC bus voltage, motor current, DI status, temperature, and status words. The date and time of each fault and fault reset attempt shall be stored in the Fault Logger.
 - .2 An Event Logger that stores the last 16 warnings or events that occurred in non-volatile memory. Events shall include, but not limited to: warning messages, checksum mismatch, run permissive open, start interlock open, and automatic reset of a fault. The date and time of each event's start and completion points shall be stored in the Event Logger.
 - .3 Programmable start method. Start method shall be selectable based

- on the application: flying-start, normal-start, and brake-on-start.
- .4 Programmable loss-of-load (broken belt / coupling) indication. Indication shall be selectable as a control panel warning, relay output, or over network communications. This function to include a programmable time delay to eliminate false loss-of-load indications.
 - .5 Motor heating function to prevent condensation build up in the motor. Motor heating adjustment, via parameter, shall be in "Watts." Heating functions based only on "percent current" are not acceptable.
 - .6 Advanced power metering abilities shall be included in the drive. Drives without these data points must include a separate power meter with each drive.
 - .1 Instantaneous output power (kW)
 - .2 Total power broken down by kWh, MWh, and GWh units of measurement. Power meters that only display kWh and roll over or "max out" once the maximum kWh value is reached are not acceptable. There shall be resettable and non-resettable total power meters within the drive.
 - .3 Time based kWh metering for: current hour, previous hour, current day, and previous day.
 - .4 Energy saving calculation shall be included that shows the energy and dollars saved by the drive.
 - .7 The drive shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and reduce audible motor noise.
 - .8 External fault circuit – three separate external fault inputs shall be provided. This circuit shall have the same features and functionality as the start interlock circuit except it shall require a manual reset before the drive is allowed to operate the motor.
 - .9 The drive shall include a switching frequency control circuit that reduces the switching frequency based on actual drive temperature and allows higher switching frequency settings without derating the drive. It shall be possible to set a minimum and a target switching frequency.
 - .10 The ability to automatically restart after an over-current, over-voltage, under-voltage, external fault, or loss of input signal protective trip. The number of restart attempts, trial time, and time between attempts shall be programmable. Each of these faults may have automatic restart individually disabled via a parameter selection.
 - .11 Three (3) programmable critical frequency lockout ranges to prevent the drive from operating the load continuously at an unstable speed/load.
 - .12 Seven (7) programmable preset frequencies/speeds.
 - .13 Two independently adjustable accel and decel ramps with 1 – 1800 seconds adjustable time ramps.

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- .14 At least 4 parameter user sets that can be saved to the permanent memory and recalled using a digital input, timed function, or supervision function.
 - .15 Drive shall be compatible with an accessory that allows the control board to be powered from an external 24 VDC/VAC source allowing the drive control to remain powered by a UPS during an extended power outage.
 - .16 The drive shall include a fireman's override mode. Upon receipt of a contact closure from the Fire Alarm Life Safety system, the drive shall operate in a dedicated override mode distinct and separate from the drive's normal operation mode. The following features will be available in the drive override function:
 - .1 The override mode shall be secured by password to prevent changes once programmed.
 - .2 The drive shall ignore external inputs and commands not defined as part of the override function.
 - .3 Override operation mode shall be selectable between: single frequency, multiple fixed frequencies, follow an analog input signal, PID control, or come to a forced stop.
 - .4 High priority safeties shall stop the drive and lower priority safeties shall be ignored in override mode.
 - .5 Drive faults shall be defined in critical and low priority groups. Critical faults shall stop the drive. Low priority faults shall be reset. Reset trials and timing shall be programmable.
 - .6 The drive shall be configurable to receive from 1 to 3 discrete digital input signals and operate at up to three discrete speeds.
 - .17 Security Features
 - .1 The drive shall include password protection against parameter changes.
 - .2 There shall be multiple levels of password protection including: end user, service, advanced, and override.
 - .3 The drive shall support a customer generated unique password between 0 and 99,999,999.
 - .4 The drive shall log an event whenever the drive password has been entered.
 - .5 The drive shall provide a security selection that prevents any "back door" entry. This selection even prevents the drive manufacturer from being able to bypass the security of that drive.
 - .6 A security level shall be available that prevents the drive from being flashed with new firmware.
 - .18 Network Communications
 - .1 The drive shall have an EIA-485 port with removable terminal blocks. The onboard protocols shall be BACnet MS/TP, Modbus, and Johnson Controls N2. Optional communication cards for BACnet/IP, LonWorks, Profibus, Profinet, EtherNet/IP, Modbus TCP, and DeviceNet shall be available. The use of third party gateways are not acceptable.

- .2 The drive shall have the ability to communicate via two protocols at the same time, one onboard protocol, and one option card based protocol. Once installed, the drive shall automatically recognize any optional communication cards without the need for additional programming.
- .3 The drive shall not require a power cycle after communication parameters have been updated.
- .4 The embedded BACnet connection shall be a MS/TP interface. The drive shall be BTL listed to revision 14 or later. Use of non-BTL listed drives are not acceptable.
- .5 The drive shall be classified as an Applications Specific Controller (B-ASC). The interface shall support all BIBBs defined by the BACnet standard profile for a B-ASC including, but not limited to:
 - .1 Data sharing: read property Multiple-B, write property Multiple-B, COV-B
 - .2 Device management: Time synchronization-B
 - .3 Object type support: MSV, Loop
- .6 The drive's relay output status, digital input status, analog input/output values, hand-auto status, warning, and fault information shall be capable of being monitored over the network. The drive's start/stop command, speed reference command, relay outputs, and analog outputs shall be capable of being controlled over the network. Remote drive fault reset shall be possible.
- .7 Unit mounted manual VFD bypass switch shall lock out VFD. Fan shall run on maximum set volume. Bypass switch and all interlock contacts are factory mounted and pre-wired.
- .8 Load reactors shall be provided for all 575 volt applications.
- .9 Drive(s) shall be factory supplied and field supplied installed by mechanical or electrical contractor.
- .10 Minimum air flow rate of 35% CFM on gas fired heat exchangers.
- .19 Motor, fan bearings, and drive sheaves assembly shall be located inside the fan plenum to minimize bearing wear and to allow for internal vibration isolation of the fan-motor assembly where required. Motor mounting shall be adjustable to allow for variations in belt tension.
- .20 Fan-motor assemblies shall be provided with vibration isolators. Isolators shall be bolted to steel channel welded to unit floor that is welded to the structural frame of the unit. Use of separate bumpers or snubbers are not acceptable. Fans shall be attached to the discharge panel by a polyvinyl chloride coated polyester woven fabric with a sealed double locking fabric to metal connection. The isolators shall be neoprene-in-shear type for single 9" (230 mm) to 15" (380 mm) diameter forward curve fans. All forward curve fans 18" (457mm) in diameter and larger and all backward inclined fans shall incorporate vertical spring isolators with leveling bolts and bridge bearing waffled pads with minimum 1" (25 mm) static deflection designed to achieve high isolation efficiency.

- .21 Fan motors shall be ODP (open drip proof) high efficiency type.

PART 3 - GAS HEAT SECTION - Indirect Fired

3.1. General

- .1 Heating units shall be indirect natural gas fired approved for both sea level and high altitude elevations. The entire package including damper controls, fan controls, and all other miscellaneous controls and accessories shall be pre-wired and factory certified by an approved testing agency such as ETL, UL, or CSA for the destination.
- .2 Operating natural gas pressure at unit(s) shall be 7"WC (1750 Pa).
- .3 Installation and venting provisions must be in accordance with installation code CAN/CSA B149.1, ANSI Z223.1-NFPA54 and the requirements of the local authorities having jurisdiction.

3.2. Heat Exchanger/Burner Assembly

- .1 Heat exchanger shall be a primary drum and multi-tube secondary assembly constructed of titanium stainless steel with multi-plane metal turbulators and shall be of a floating stress relief design. Heat exchanger shall be provided with condensate drain connection. The heat exchanger casing shall have 1" (25 mm) of insulation between the outer cabinet and inner heat reflective satin coat galvanized steel liner. Blower location shall be engineered to optimize the required air flow pattern around the heat exchanger. Duct type furnaces with closed coupled blowers are not acceptable.
- .2 Units with high efficiency heat exchangers shall be tested and certified to the National Energy Code of Canada and local authorities having jurisdiction. A minimum of 91% efficiency shall be provided throughout the entire operating range of the heat exchanger. The manufacturer shall be routinely engaged in the manufacture of this type of high efficiency equipment.
- .3 The heat exchanger/burner assembly shall be a blow through positive pressure type. Units incorporating the DJM module shall have an interrupted pilot ignition system to provide increased safety. Units using continuous or intermittent pilots are not acceptable.
- .4 Flame surveillance shall be from the main flame after ignition not the pilot flame. The burner and gas train shall be in a cabinet enclosure. Atmospheric burners or burners requiring power assisted venting are not acceptable.

3.3. Factory testing of indirect fired gas heating section.

- .1 The minimum test requirements on all cabinet / fan size / fan type / fan orientation / heat exchanger / outlet configuration combinations previously built are listed below:
- .1 Tests shall be performed after complete final unit assembly just prior to shipping to job site. The tests shall be performed in accordance with the equipment standard that the gas heating section is certified.
- .2 Heat exchanger shall be clogged with a dedicated calibrated gas meter to

- ensure proper set up of the gas manifold.
- .3 High and low input flue gas combustion analysis using a calibrated combustion analyzer including O₂ and CO to provide proper air fuel ratio throughout the entire operating range.
- 3.4. Venting
- .1 Indoor DJX Series require installation and condensing vent provisions which must be in accordance with installation code CAN/CSA B149.1, ANSI Z223.1-NFPA54 and the requirements of the local authorities having jurisdiction. Type "BH" category II venting is required on indoor units.
- 3.5. The heat exchanger/burner assembly shall include 15:1 turndown for all input ranges. The high turn down heat exchanger/burner assembly minimum input shall be capable of controlling down to 6.7% of its rated input, excluding the pilot assembly, without on/off cycling and include built in electronic linearization of fuel and combustion air. Efficiency shall increase from high to low fire.
- 3.6. The **NextGen base** (modulating fuel and combustion air) shall be complete with proportional and integral control and discharge air sensor to maintain set point temperature and provide rapid response to incremental changes in the discharge air temperature.
- .1 The controller shall be certified by ETL
- .2 The combustion air motor speed shall vary proportionally in response to the modulation of gas flow to provide optimum fuel/air mixture and efficiency at all conditions. The combustion blower RPM shall be proved using a Hall Effect speed sensor. Efficiency of the heat exchanger shall increase as the firing rate decreases.
- .3 The controller shall provide a pre-purge and post purge cycle to provide a minimum of four air changes for each purge cycle through the heat exchanger.
- .4 The controller shall provide a low fire start with controlled burner startup and shutdown.
- .5 To ensure longevity of the equipment, the controller shall provide heat exchanger cooldown timing.
- .6 For MUA applications, the blower shall not start until after the burner pre-purge and warmup are completed if the ambient temperature is more than 8°F (4.4°C) cooler than the setpoint and ambient is below 20°F (-7°C)
- 3.7. Controllers for heating only units to incorporate low limit feature.
- 3.8. Discharge air sensor shall be field mounted in supply ductwork by installing contractor.
- 3.9. On Make-up air units, provide a reverse airflow high limit switch in series with the standard high limit switch mounted in the blower discharge.
- 3.10. DJX Condensate
- .1 Installing contractor to check with local codes and jurisdictions regarding field connecting condensate drain connection to sanitary sewer. A condensate neutralizer

may be required. Contractor to provide piping to condensate drain connection on all DJX heat exchangers.

- .2 Installing contractor is to locate condensate neutralizing tank in a heated space away from the appliance at a point lower than the unit heat exchanger to promote gravity flow to sanitary sewer. Where this is not possible, a condensate pump may be required.

PART 4 - FILTERS

- 4.1. Filter sections shall be provided with adequately sized access doors to allow easy removal of filters. Filter removal shall be from one side of the unit as noted on the drawings.
- 4.2. The filters shall be designed to slide out of the unit. Side removal filters shall slide into a formed metal track sealing against metal spacers at each end of the track.
- 4.3. 2" (50 mm) Extended Media (Pleated) Disposable Filters: Filters shall be extended surface pleated complete with 100% synthetic media that does not support microbial growth. Frame shall be a high wet strength beverage board with a cross member design that increases filter rigidity and prevent breaching. Frame shall be recyclable. Filters shall have an expanded metal support grid bonded to the air-exiting side of the filter to maintain pleat uniformity and prevent fluttering. Metal support grid shall be recyclable. The filters shall be MERV 8 per ASHRAE 52.2. and rated U.L. 900 Class II. A permanent re-usable metal enclosing frame shall be provided for side loaded applications.

PART 5 - DAMPERS

- 5.1. Dampers shall be extruded aluminum, low leak, insulated blade Tamco Series 9000.
- 5.2. Two position inlet dampers shall be parallel blade type.
- 5.3. Makeup air inlet damper control shall be complete with a two position, normally closed electric damper operator. This damper operator shall be interlocked so that when the unit is shut down, or on a power failure, the damper shall return to the closed position.

PART 6 - FACTORY SUPPLIED CONTROLS/WIRING

- 6.1. Provide a system of motor control, including all necessary terminal blocks, motor contactors, motor overload protection, grounding lugs, control transformers, auxiliary contactors, and terminals for the connection of external control devices or relays.
- 6.2. Gas fired units shall also include high limit and combustion airflow safeties.
- 6.3. Electric heat units shall include fan access door switch (to shut heater off when door is opened), auxiliary high limit, airflow switch, and heating contactors.
- 6.4. Fire alarm circuits (where required) shall be powered from a relay in unit circuitry.
- 6.5. Factory installed and wired non-fused disconnect switch in NEMA type 1.

- 6.6. Controls shall be housed in a control panel mounted in or on the unit that will meet the standard of the specific installation.
- 6.7. Provide a discharge air low limit equipped with an automatic by-pass time delay to allow for cold weather start-up. On a heating system failure, this device will shut down the fan and close the outdoor air damper.
- 6.8. NextGen Base
- .1 The controller shall be ETL certified.
 - .2 A numerical display and LED lights shall provide status information.
 - .3 The controller shall have a computer connection diagnostics via Ethernet complete with web based interface.
 - .4 Minimum operating ambient temperature shall be -40°F (-40°C).
 - .5 The controller shall provide continuous ambient temperature sensing.
 - .6 Self-check on start-up shall be provided to ensure air proving and all sensors are operating within design tolerances.
 - .7 Blower delay functionality shall be provided to ensure damper(s) are open before blower starts. A damper end switch shall be provided. Controller shall have an input for external damper end switch contact that enables the fan to start once damper contact is closed (Internal time delays are bypassed)
 - .8 The controller shall have a non-recycling auto by-pass low limit complete with alarm contacts.
 - .9 Temperature control shall be discharge air c/w 0-10VDC reset.
 - .10 Unit's shall be complete with BAS monitoring points and indicators as specified by the consultant.

PART 7 - EXECUTION

7.1. INSTALLATION

- .1 Install units in accordance with the manufacturer's requirements.
- .2 Install controls and devices where indicated on the drawings and wire to the appropriate unit(s).
- .3 Arrange for manufacturers authorized representative to inspect installation and provide supervision and start-up service. Check alignment of bearings, drives, motors after installation and make any necessary alignment adjustments prior to start-up.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Division 20 – Mechanical General Requirements.
- .2 Provide all labour, materials, products, equipment, and services to supply and install the direct expansion air conditioners indicated on the drawings and specified herein.

PART 2 - PRODUCTS

2.1. SPLIT AIR CONDITIONING SYSTEMS - DIRECT EXPANSION, AIR COOLED

- .1 Provide split air conditioning system(s), each consisting of indoor package air handling unit and outdoor air-cooled compressor/condenser unit piped and wired to form complete air conditioning system. Refer to the Schedule on the drawings.
- .2 Provide indoor package unit(s), outdoor air-cooled condensing unit(s), refrigerant piping, refrigerant filter drier(s), controls and all necessary components as recommended by manufacturer to give complete operating air conditioning system(s). Indoor package unit(s) and air-cooled condensing unit(s) shall be supplied by the same manufacturer and matched for integral operation.
- .3 Provide outdoor fan relay(s) for control of remote condenser fans.
- .4 Provide indoor unit(s) and outdoor unit(s) designed and built for variable air volume operation with automatic compressor capacity control and hot gas bypass. Provide internal controls for discharge air temperature with adjustable setpoint.
- .5 Provide short cycle timer circuit to prevent compressor short cycling.
- .6 Provide winter start package(s) to allow compressor start and operation under low ambient conditions. Include evaporator defrost thermostat and low refrigerant pressure cut-out switch bypass.
- .7 Warranty compressor units for 5 years.
- .8 Provide units which do not require licensed operators under the Operating Engineers Act.

PART 3 - EXECUTION

3.1. INSTALLATION

- .1 Install indoor unit in accordance with manufacturer's installation instructions. Make all connections necessary.
- .2 Install outdoor unit plumb and level on concrete pad or wall mounted as required, making all necessary piping connections.

- .3 Install refrigerant line kits in accordance with manufacturer's installation instructions.
- .4 Refrigeration Equipment: prepare system for start-up by having manufacturer's field engineer or factory trained representative supervise testing and charging of machines.
- .5 Testing:
 - .1 Provide sufficient refrigerant, dry nitrogen and refrigeration oil for pressure and operational testing under manufacturer's supervision.
 - .2 Prior to testing ensure that system is complete. Protect relief valves during test procedure. After completion of test, reconnect and make good piping connections and leak test entire system.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements.

1.2. APPLICATION

- .1 This Section specifies requirements that are common to electrical Work Sections of the Specification, and it is a supplement to each Section and is to be read accordingly.

1.3. NOTE RE: BOLD LETTERING

- .1 "Bold" type lettering is used throughout this Specification in an attempt to enhance the readability of the text. The use of "bold" lettering does not indicate a greater level of importance.

1.4. SUBMITTALS

- .1 As specified in this Section, submit the following to the Consultant:
 - .1 project close-out documentation: O & M Manuals, record as-built drawings, and all associated data.
 - .2 progress payment breakdown: a detailed breakdown of the electrical Work cost
 - .3 Contractor's P. Eng. Documentation: the name, qualifications, and evidence of current liability insurance for all professional engineers to be retained by the Contractor to perform Work associated with the Contract.
 - .4 Extended Warranties: copies of all extended warranties specified, and in the name of the Owner.
 - .5 O & M Training Schedules & Manual: a proposed schedule of demonstration and training dates and times, and a preliminary copy of the training manual developed for operational and maintenance training

1.5. DEFINITIONS

- .1 The following are definitions of words found in electrical Work Sections of the Specification and on associated drawings:
 - .1 "concealed" – means Work hidden from normal sight in furred spaces, shafts, tunnels, ceiling spaces, walls, and partitions.
 - .2 "exposed" – means Work normally visible, including Work in electrical and equipment rooms and similar spaces.
 - .3 "provide" (and tenses of provide) – means supply and install complete.

- .4 "install" (and tenses of install) – means install and connect complete.
 - .5 "supply" – means supply only.
 - .6 "finished area" - means any area or part of an area which receives a finish such as paint, or is factory finished.
 - .7 "governing authority" and/or "regulatory authority" and/or "Municipal authority" – means all government departments, agencies, standards, rules, and regulations that apply to and govern the electrical Work and to which the Work must adhere.
 - .8 "Consultant" – means the Architect or Consulting Engineer who has prepared the Contract Documents on behalf of the Owner.
- .2 Wherever the words "indicated", "shown", "noted", "listed", or similar words or phrases are used in the Specification they are understood, unless otherwise defined, to mean that the product referred to as "indicated", "shown", "listed", or "noted" on the drawings.
 - .3 Wherever the words "approved", "satisfactory", "as directed", "submit", "permitted", "inspected" or similar words or phrases are used in the Specification or on the drawings they are understood, unless otherwise defined, to mean that Work or product referred to as "approved by", "inspected by", etc., the Consultant.
 - .4 In the electrical Specification, singular may be read as plural, and vice-versa.

1.6. QUALITY ASSURANCE

- .1 All electrical Work is to be done by journeyman tradesmen who perform only the Work that their certificates permit, or by apprentice tradesmen under direct on-site supervision of an experienced journeyman tradesman. The use of apprentice tradesmen is to be limited and the journeyman/apprentice ratio is subject to the Consultant's approval.
- .2 An experienced and qualified superintendent is to be on-site at all times when electrical Work is being performed.

1.7. CODES, REGULATIONS, AND STANDARDS

- .1 All Codes, Regulations, and Standards referred to in this Section and in Sections to which this Section applies are the latest edition of the Codes, Regulations, and Standards in effect at the time of bidding on this Project.
- .2 All electrical items are to be certified and bear the stamp or seal of a recognized testing agency such as CSA, UL, ULC, ETL, etc., or bear a stamp to indicate special electrical utility approval.
- .3 Requirements of the Contract Documents are to take precedence when they are more stringent than codes, ordinances, standards, and statutes.

1.8. IMPERIAL AND METRIC MEASUREMENTS

- .1 Conform to requirements of CAN/CSA-Z234.1, Canadian Metric Practice Guide.
- .2 Both Metric and Imperial units of measurement are indicated in the electrical Specification. Metric measurements are "soft" and have been rounded off.

1.9. EXAMINATION OF SITE AND DOCUMENTS

- .1 When estimating the cost of the Work and prior to submitting a bid for the Work carefully examine all of the bid documents and visit the site to determine and review all existing site conditions that will or may affect the Work and include for all such conditions in the bid price.
- .2 Report to the Consultant, prior to bid submittal, any existing site condition that will or may affect performance of the Work as per the drawings and Specifications. Failure to do so will not be grounds for additional costs.

1.10. DRAWINGS AND SPECIFICATION

- .1 Read the electrical Work drawings in conjunction with all other structural, architectural, sprinkler, mechanical, etc., drawings.
- .2 The electrical drawings are performance drawings, diagrammatic, and show approximate locations of equipment and connecting services. Any information regarding accurate measurement of the building are to be taken at the site. Do not scale the drawings, and do not use the drawings for prefabrication Work.
- .3 The drawings are intended to convey the scope of Work and do not show architectural and structural details. Provide, at your cost, all offsets, fittings, transformations, and similar products required as a result of obstructions and other architectural and structural details but not shown on the drawings.
- .4 The locations of equipment and materials shown may be altered, when reviewed by the Consultant, to meet requirements of the equipment and/or materials, other equipment or systems being installed, and of the building, all at your cost.
- .5 Sections of the electrical Specification are not intended to delegate functions nor to delegate Work and supply of materials to any specific trade, but rather to generally designate a basic unit of Work, and the Sections are to be read as a whole.
- .6 The electrical Specification does not generally indicate the specific number of items or extent of material required. The Specification is intended to provide product data and installation requirements. It is necessary to refer to drawing schedules, layouts, schematic diagrams, riser diagrams, and details to determine correct quantities.
- .7 The electrical drawings and Specification are intended to be cooperative. Perform all Work that is shown, specified, or reasonably implied on the drawings but not mentioned in the Specification, or vice-versa, as though fully covered by both.
- .8 When the scale and date of the drawings are the same, or when the discrepancy exists within the Specification, the costliest arrangement will take precedence.
- .9 In the case of discrepancies or conflicts between the drawings and Specification, the documents will govern in the following order:

- .1 the Specification
 - .2 drawings of larger scale
 - .3 drawings of smaller scale
 - .4 drawings of later date when the scale of the drawings is the same.
- .10 In the case of discrepancies between the drawings and Specifications, the documents will govern in the order specified in the General Conditions, however, when the scale and date of the drawings are the same, or where the discrepancy exists within the Specification, the costliest arrangement will take precedence.

1.11. PLANNING AND LAYOUT OF THE WORK, AND ASSOCIATED DRAWINGS

- .1 Properly plan, coordinate, and establish the locations and routing of services with all subcontractors affected prior to installation such that the services will clear each other as well as any obstructions, including structural components of the building. Unless otherwise specified, the order of right-of-way for services is to be as follows:
 - .1 piping requiring uniform pitch.
 - .2 piping 100 mm (4") dia. and larger
 - .3 large ducts (main runs)
 - .4 electrical cable tray and bus duct
 - .5 conduit 100 mm (4") dia. and larger
 - .6 piping less than 100 mm (4") diameter
 - .7 smaller branch ductwork
 - .8 conduit less than 100 mm (4") diameter
- .2 Unless otherwise shown or specified, conceal all Work in finished areas, and conceal Work in partially finished or unfinished areas to the extent made possible by the area Construction. Install conduit, raceway, and similar services as high as possible to conserve headroom and/or ceiling space. Notify the Consultant where headroom or ceiling space appears to be inadequate prior to installation of the Work.
- .3 Revise or alter the arrangement of Work that has been installed without proper coordination, study, and review, even if it was completed in accordance with the Contract Documents, in order to conceal the Work behind finishes, or to allow the installation of other Work, at no additional cost. In addition, pay for the cost of alterations in other Work required by the alterations to your Work.
- .4 All junction boxes, equipment, and similar products, particularly such products located above suspended ceilings must be located for easy access for servicing and/or removal. Products which do not meet this location requirement are to be relocated to an accessible location at no additional cost.

1.12. COORDINATION OF THE WORK

- .1 Review all the Contract Documents and coordinate the Work with the Work of all subcontractors. Coordination requirements are to include, but not be limited to, the following:
 - .1 written notifications of all concrete Work such as housekeeping pads, bases, etc., required for electrical Work, and including required dimensions, operating weight of equipment, location, etc.
 - .2 depth and routing of excavation required for electrical Work, and requirements for bedding and backfill.

1.13. GENERAL RE: INSTALLATION OF EQUIPMENT

- .1 Unless otherwise specified all equipment is to be installed in accordance with the equipment manufacturer's recommendations and instructions, and requirements of governing Codes, Standards, and Regulations. Governing Codes, Standards, and Regulations take precedence over manufacturer's instructions.
- .2 Ensure that proper access and service clearances are maintained around equipment, and, where applicable, access space for future equipment removal or replacement is not impeded. Remove and replace any equipment which does not meet this requirement.

1.14. PERMITS, FEES, AND CERTIFICATES

- .1 Apply for, obtain, and pay for all permits required to complete the electrical Work.
- .2 Submit to the Consultant, all approval/inspection certificates issued by governing authorities to confirm that the Work as installed is in accordance with the rules and regulations of the governing authorities. Pay any costs associated with issue of the certificates.
- .3 Include a copy of all approval/inspection certificates in each operating and maintenance manual.

1.15. WORKPLACE SAFETY

- .1 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage, and disposal of hazardous materials. Submit WHMIS MSDS (Material Safety Data Sheets) for all products where required and maintain one copy at the site in a visible and accessible location available to all personnel.
- .2 Comply with all requirements of Occupational Health and Safety Regulations and all other regulations pertaining to health and safety, including worker's compensation/insurance board and fall protection regulations.
- .3 Asbestos, Mould, Lead Paint, Etc.: If at any time during the course of the Work asbestos containing materials, black mould, lead paint, or any other such materials are encountered or suspected, immediately report the discovery to the Consultant and cease all Work in the area in question. Do not resume Work in affected areas until

the situation has been properly corrected and without written approval from the Owner.

1.16. CHANGES OR REVISIONS TO THE WORK

- .1 Whenever the Consultant proposes in writing to make a change or revision to the design, arrangement, quantity, or type of any Work from that required by the Contract Documents, prepare, and submit to the Consultant for approval, a quotation being your proposed cost for executing the change or revision.
- .2 Your quotation is to be a detailed and itemized estimate of all products, material, labour, and equipment costs associated with the change or revision, plus overhead and profit percentages and all applicable taxes and duties.
- .3 Unless otherwise stated in the Contract Documents, the following requirements apply to all quotations submitted:
 - .1 when the change or revision involves deleted Work as well as additional Work, the cost of the deleted Work (less overhead and profit percentages but including taxes and duties) is to be subtracted from the cost of the additional Work before overhead and profit percentages are applied to the additional Work.
 - .2 material costs are not to exceed those published in local estimating price guides such as Allpriser, less applicable trade discounts.
 - .3 costs for journeyman and apprentice labour must not exceed prevailing rates at the time of execution of the Contract and must reflect the actual personnel performing the Work.
 - .4 cost for the site superintendent must not exceed 10% of the total hours of labour estimated for the change or revision, and the change or revision must be such that the site superintendent's involvement is necessary.
 - .5 costs for rental tools and/or equipment are not to exceed local rental costs.
 - .6 the overhead percentage will be deemed to cover all quotation costs other than actual site labour, product and materials, and rentals.
 - .7 all quotations, including those for deleted Work, must include a figure for any required change to the Contract time.
- .4 Quotations submitted that are not in accordance with requirements specified above will be rejected and returned for re-submittal. Failure to submit a proper quotation to enable the Consultant to expeditiously process the quotation and issue a Change Order will not be grounds for any additional change to Contract time.
- .5 If, in your opinion, changes or revisions to the Work should be made, inform the Consultant in writing and, if the Consultant agrees a Notice of Change will be issued.
- .6 Do not execute any change or revision until written authorization for the change or revision has been obtained.

1.17. EQUIPMENT AND MATERIAL MANUFACTURER REQUIREMENTS

- .1 Equipment and materials scheduled or specified on the drawings or in the Specification have been selected to establish a performance and quality standard.
- .2 In most cases acceptable equipment and material manufacturers are listed for any product specified by manufacturer's name and model number. Unless otherwise stated the bid price may be based on products supplied by any of the manufacturers named as acceptable for the particular product. If acceptable manufacturers are not listed for a particular product, base the bid price on the products supplied by the specified manufacturers.
- .3 If products supplied by a manufacturer named as acceptable are used in lieu of the products specified by manufacturer's name and model number, ensure that the product is equivalent in performance and operating characteristics (including energy efficiency if applicable) to the specified product. Pay for any additional costs and changes to associated or adjacent Work resulting from the use of products supplied by a manufacturer other than the specified manufacturer. In addition, in equipment spaces where products named as acceptable are used in lieu of the specified products and the dimensions of such products differ from the specified products prepare and submit for review, if requested, accurately dimensioned layouts of the rooms affected to prove that all the equipment in the room will fit properly.

1.18. EQUIPMENT AND SYSTEM MANUFACTURER'S CERTIFICATION

- .1 When equipment/system installation is complete, but prior to start-up procedures, arrange and pay for the equipment/system manufacturer's authorized representative to visit the site to examine the installation, and when any required corrective measures have been made, to certify in writing to the Consultant that the equipment/system installation is complete and in accordance with the equipment/system manufacturer's instructions.

1.19. EQUIPMENT AND SYSTEM START-UP

- .1 When installation of equipment/systems is complete but prior to commissioning, perform start-up for equipment/systems as specified in electrical Work Sections in accordance with the following requirements:
 - .1 submit a copy of each equipment/system manufacturer's start-up report sheet to the Consultant for review and incorporate any comments.
 - .2 under direct on-site supervision and involvement of the equipment/system manufacturer's representative, start-up the equipment/systems, make any required adjustments, document the procedures, leave the equipment/systems in proper operating condition, and submit a complete set of start-up documentation sheets signed by the manufacturer/supplier and the Contractor.

1.20. EQUIPMENT AND SYSTEM COMMISSIONING

- .1 After successful start-up and prior to Substantial Performance, commission the electrical Work using approved commissioning sheets. Submit final commissioning

data sheets. Include for equipment manufacturer's representation at the site to assist in the commissioning process.

1.21. EQUIPMENT AND SYSTEM O & M DEMONSTRATION & TRAINING

- .1 Refer to equipment and system operational and maintenance training requirements specified in Division 01.
- .2 Train the Owner's designated personnel in all aspects of operation and maintenance of equipment and systems as specified in electrical Work Sections of the Specification. All demonstrations and training are to be performed by qualified technicians employed by the equipment/system manufacturer/supplier.
- .3 For each item of equipment and for each system for which training is specified, prepare training modules as specified below. Operating and Maintenance Manuals are to be used during the training sessions, and training modules are to include:
 - .1 Operational Requirements and Criteria: requirements and criteria are to include but not be limited to equipment function, stopping, and starting, safeties, operating standards, operating characteristics, and limitations.
 - .2 Troubleshooting: troubleshooting is to include but not be limited to diagnostic instructions, test, and inspection procedures
 - .3 Documentation: documentation is to include but not be limited to equipment/system warranties, and manufacturer's/supplier's parts and service facilities, telephone numbers, email addresses, and the like
 - .4 Maintenance: maintenance requirements are to include but not be limited to inspection instructions, types of cleaning agents to be used as well as cleaning methods, preventive maintenance procedures, and use of any special tools
 - .5 Repairs: repair requirements are to include but not be limited to diagnostic instructions, disassembly, component removal and repair instructions, instructions for identifying parts and components, and review of any spare parts inventory
- .4 Assemble the training modules into a training manual and submit a copy to the Consultant for review prior to scheduling training. Ensure that each participant in each training session has all required training material.
- .5 Schedule demonstrations and training at mutually agreed to times with a minimum of 7 working days' notice.
- .6 Demonstration and Training Confirmation: Obtain a list of personnel to receive demonstration and training from the Consultant, and have each participant sign the list to confirm that he/she understood the demonstration and training session.

PART 2 - PRODUCTS

- .1 Not Used.

PART 3 - EXECUTION

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. APPLICATION

- .1 This Section specifies products, common criteria and characteristics, and methods and execution that are common to one or more electrical Work Sections of the Specification, and it is intended as a supplement to each Section and is to be read accordingly.

1.3. SUBMITTALS

- .1 Submit the following for review:
 - .1 product data sheets: submit for:
 - .1 firestopping and smoke seal products
 - .2 waterproofing seal assemblies
 - .3 electrical Work identification products
 - .2 access door locations: submit white prints of architectural reflected ceiling plan drawings and elevation drawings to indicate proposed access door locations in walls and ceilings in finished areas.
 - .3 samples: submit a sample of each proposed type of access door, and samples of materials and any other items as specified in electrical Work Sections of the Specification
 - .4 list of equipment nameplates: submit a list of equipment identification nameplates indicating proposed wording and sizes.
 - .5 conduit & conductor identification: submit a list of conduit and conductor identification colour coding and wording.
 - .6 sleeve and formed opening location drawings: submit, prior to concrete pours, accurately dimensioned drawings to locate all required sleeves, formed openings, and recesses required in poured concrete.
 - .7 waste management and reduction plan: submit a waste management and reduction plan prior to commencing Work and as per requirements specified in this Section.
 - .8 additional submittals: submit any other submittals specified in this Section or other electrical Work Sections of the Specification

PART 2 - PRODUCTS

2.1. SLEEVES

- .1 Galvanized Sheet Steel: Minimum #16-gauge galvanized steel with an integral flange at one end to secure the sleeve to formwork Construction.
- .2 Polyethylene: Factory fabricated, flanged, high density polyethylene sleeves with reinforced nail bosses.
- .3 Waterproof Sleeves: Schedule 40 mild galvanized steel pipe with a welded-on square steel anchor and water stop plate at the sleeve midpoint, or PSI-Thunderline "Century-Line" Model CS HDPE sleeves.
- .4 Galvanized Steel: Schedule 40 mild galvanized steel.

2.2. MULTI-CABLE TRANSITS

- .1 UL/ULC listed and labelled multi-cable transits sized to suit the fire barrier opening and the number of cables/conduits involved and to facilitate a minimum 2-hour water-tight fire and smoke seal. Each assembly is to be complete with a stainless-steel frame, cadmium plated compression bolts, proper end packing, compression plates, steel stay plates, and fire rated neoprene insert blocks.

2.3. FIRESTOPPING AND SMOKE SEAL MATERIALS

- .1 Firestopping and smoke seal system materials for electrical penetrations through fire rated Construction are specified in Division 07 and the Work will be done as part of the Work of Division 07.

2.4. WATERPROOFING SEAL MATERIALS

- .1 Modular, mechanical seal assemblies consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the pipe sleeve or wall opening, assembled with stainless steel bolts and pressure plates, and designed so that when the bolts are tightened the links expand to seal the opening watertight. The seal assemblies are to be selected to suit the pipe size and the sleeve size or wall opening size. Acceptable products are:
 - .1 Thunderline Corp. (Power Plant Supply Co.) "LINK SEAL" Model S-316.
 - .2 The Metraflex Co. "MetraSeal" type ES.

2.5. ESCUTCHEON PLATES

- .1 One-piece chrome plated brass or #4 finish type 302 stainless steel plates with matching screws for attachment to the building surface, each plate sized to completely cover the conduit/cable sleeve or building surface opening, and to fit tightly around the conduit or cable.

2.6. ACCESS DOORS

- .1 Prime coat painted steel (unless otherwise specified) flush access doors, each complete with a minimum #16-gauge frame, minimum #18-gauge door panel, heavy-duty rust-resistant concealed hinges, a positive locking screwdriver lock, and mounting and finishing features to suit the particular Construction in which it is to be installed.
- .2 Access door sizes are to suit the concealed Work for which they are supplied, and wherever possible they are to be of a standard size for all applications, but in any case, they are to be minimum 300 mm x 300 mm (12" x 12") for hand entry and 600 mm x 600 mm (24" x 24") for body entry.
- .3 Access doors in fire rated Construction are to be ULC listed and labelled and of a rating to maintain the fire separation integrity.
- .4 Where access doors are located in surfaces where special finishes are required, they are to be of a recessed door type capable of accepting the finish in which they are to be installed so as to maintain the final building surface appearance throughout and constructed of stainless steel with a #4 finish.

2.7. IDENTIFICATION MATERIALS

- .1 Equipment Nameplates: Minimum 1.6 mm (1/16") thick 2-ply laminated coloured plastic plates, minimum 12 mm x 50 mm (½" x 2") for smaller items such as single-phase starters and switches, minimum 25 mm x 65 mm (1" x 2½") for equipment, and minimum 50 mm x 100 mm (2" x 4") for control panels and similar items. Additional requirements are as follows:
 - .1 unless otherwise specified or required, each nameplate is to be white, complete with bevelled edges and black engraved capital letter wording to completely identify the equipment and its use with no abbreviations.
 - .2 wording is generally to be as per the drawings, i.e., Lighting Panel A, and is to include equipment service and building area/zone served but must be reviewed prior to engraving.
 - .3 supply stainless steel screws for securing nameplates in place.
 - .4 nameplates for equipment suspended above floor level or generally not within easy viewing from floor level are to be increased in size so as to be easily readable from floor level.
- .2 Self-Adhesive Labels: Equal to Brother "P-Touch" or Thomas & Betts Canada Ltd. "EZCODE" Model EZL500 electronic labelling system self-adhesive labels with size and colour as directed, and permanently printed circuit identification nomenclature which is to be approved by the Consultant prior to producing the labels.
- .3 Warning Signs: Equal to Thomas & Betts Canada Ltd. "BP" Series 250 mm x 355 mm (10" x 14") semi-rigid vinyl signs with corner screw holes, the required printed wording (generally red on a white background with black trim), pressure sensitive adhesive on the back, and stainless-steel screws.

- .4 Conduit and Armoured Cable Identification: Equal to Brady Canada minimum 50 mm (2") wide self-adhesive coloured vinyl tape.
- .5 Conductor Terminations: Equal to Electrovert Ltd. Slip-on "Z" type
- .6 Conductor Colour Coding: As specified with the conductors.

2.8. ELECTRICAL ENCLOSURES

- .1 Unless otherwise specified electrical enclosure are to be wall mounting NEMA/EEMAC/CSA enclosures as follows:
 - .1 indoor in sprinkler protected areas, Type 2
 - .2 indoor in high humidity/washdown areas, Type 4
 - .3 indoor in corrosive environments, Type 4X, 316 stainless steels
 - .4 indoor explosion-proof, Class 1, Groups C & D, Type 7
 - .5 outdoor, Type 3R
 - .6 indoor in non-hazardous areas except as noted above, Type 1

2.9. ENCLOSURE BACKBOARDS

- .1 Construction grade Fir plywood, G1S, 20 mm ($\frac{3}{4}$ ") thick with width and length to suit enclosure dimensions, coated on all surfaces with a ULC listed water based latex intumescent flame-retardant paint, ASTM E-84 Class A rated.

PART 3 - EXECUTION

3.1. GENERAL ELECTRICAL WORK INSTALLATION REQUIREMENTS

- .1 Unless otherwise specified, locate, and arrange horizontal conduits, raceways, and conductors above or at the ceiling on floors on which they are shown, arranged so that under consideration of all other Work in the area, the maximum ceiling height and/or usable space is maintained.
- .2 Unless otherwise specified, install all conduits and conductors concealed in finished spaces, and concealed to the degree possible in partially finished and unfinished spaces. Refer to and examine the Architectural drawings and room finish schedules to determine finished, partially finished, and unfinished areas. Note that walls which are painted are considered finished.
- .3 Unless otherwise specified conduits and main distribution conductors may be exposed in equipment rooms.
- .4 Install all exposed conduits, raceways, and conductors parallel to building lines and to each other.
- .5 Do not install conduit, raceway, or conductors within 150 mm (6") of "hot" piping or equipment.

- .6 All conduit, raceway, conductors, etc., must be supported from the structure, not from ceiling hangers, piping, ductwork, cable tray, and similar mechanical or electrical products.
- .7 Neatly group and arrange all exposed Work. Do not install conduit to prevent access into equipment.
- .8 Access: Locate all Work to permit easy access for service or maintenance as required and/or applicable. Locate all products which will or may need maintenance or repairs and which are installed in accessible Construction so as to be easily accessible from access doors. Where such products occur in vertical services in shafts, pipe spaces or partitions, locate the accessories at the floor level.
- .9 Manufacturer's Instructions: Ensure that equipment and material manufacturer's installation instructions are followed unless otherwise specified herein or on the drawings, and unless such instructions contradict governing codes and regulations.
- .10 Cleaning: Carefully clean all conduits, raceway, fittings prior to installation. Temporarily cap or plug ends of conduit which are open and exposed during Construction.
- .11 Surfaces To Receive Your Work: Inspect surfaces and structure prepared by other trades before performing your Work. Verify that surfaces or the structure to receive your Work have no defects or discrepancies which could result in poor application or cause latent defects in installation and workmanship. Report defects in writing. Installation of your Work will constitute acceptance of such surfaces as being satisfactory.
- .12 Repair of Finished Surfaces: For factory applied finishes, repaint, or refinish all surfaces damaged during shipment and installation. The quality of the repair Work is to match the original finish. This requirement also applies to galvanized finishes.
- .13 Work In High Humidity Areas: Where electrical Work is located in high humidity areas where ferrous metal products will be subject to corrosion and protection for such products is not specified, provide finishes on the products to protect against corrosion or provide products which will not corrode in the environment.
- .14 Work In Health Care Facility Patient Care Areas: Provide conduit, conductors, and similar Work in health care facility patient care areas in accordance with the Ontario Electrical Safety Code, including amendments, and test branch circuits in accordance with CAN/CSA Z32, Electrical Safety and Essential Electrical Systems in Health Care Facilities.

3.2. INSTALLATION OF SLEEVES

- .1 Where conduits, round ducts, and armoured cable pass through concrete and/or masonry surfaces provide sleeves as follows:
 - .1 in poured concrete slabs: unless otherwise specified - minimum 16 gauge flanged galvanized steel or, where permitted by governing authorities, factory fabricated plastic sleeves.

- .2 in concrete or masonry walls: Schedule 40 galvanized steel pipe
- .2 Waterproof Sleeves: Provide waterproof sleeves in the following locations:
 - .1 in mechanical room floor slabs, except where on grade
 - .2 in slabs over mechanical, fan, electrical and telephone equipment rooms, or closets
 - .3 in all floors equipped with waterproof membranes
 - .4 in the roof slab
 - .5 in waterproof walls
- .3 Size sleeves, unless otherwise specified, to leave 12 mm ($\frac{1}{2}$ ") clearance around the conduit, duct, cable, etc.
- .4 Pack and seal the void between the sleeves and the conduit, duct, cable, etc., in non-fire rated Construction for the length of the sleeves as follows:
 - .1 interior Construction: pack sleeves in interior Construction with mineral wool and seal both ends of the sleeves with non-hardening silicone base caulking compound
 - .2 exterior walls above grade: pack sleeves in exterior walls above grade with mineral wool and seal both ends of the sleeve's water-tight with approved non-hardening silicone base caulking compound unless mechanical type seals have been specified.
 - .3 exterior walls below grade: seal sleeves in exterior walls below grade (and any other wall where water leakage may be a problem) with link type mechanical seals as specified below.
- .5 Where sleeves are required in masonry Work, accurately locate, and mark the sleeve location, and hand the sleeves to the mason for installation.
- .6 Terminate sleeves that will be exposed so that the sleeve is flush at both ends with the building surface concerned so that the sleeve may be completely covered by an escutcheon plate, except for sleeves in waterproof floors which are to terminate 100 mm (4") above the finished floor.
- .7 "Gang" type sleeving will not be permitted.
- .8 Where sleeves are provided in non-fire rated Construction for future services, or where conduit, ducts, cable, etc., has been removed from existing sleeves, cap, and seal both ends of the sleeved opening.

3.3. RECTANGULAR OPENINGS

- .1 Rectangular openings for cable tray, raceways, multiple conduits and/or cables and similar rectangular openings will be provided in new poured concrete Work, masonry,

drywall, and other building surfaces by the trade responsible for the particular Construction in which the opening is required.

- .2 Waterproof Openings: Provide watertight link type mechanical seals in exterior wall openings where shown or specified. Assemble and install each mechanical seal in accordance with the manufacturer's instructions. After installation, periodically check each mechanical seal installation for leakage and, if necessary, tighten link seal bolts until the seal is completely watertight.
- .3 Openings In Non-Fire Rated Construction: For all rectangular openings in non-fire rated Construction pack and seal the space between the conduits, ducts, cables, etc., with mineral wool for the full thickness of the building surface penetrated, and seal both ends.
- .4 Openings In Fire Rated Construction: Provide multi-cable transits in all fire rated openings and install in accordance with the manufacturer's instructions.

3.4. SLEEVE AND FORMED OPENING LOCATION DRAWINGS

- .1 Prepare and submit for review, white print drawings indicating the size and location of all required sleeves, recesses and formed openings in poured or precast concrete Work.
- .2 Such drawings are to be completely and accurately dimensioned and relate sleeve, recesses, and formed openings to suitable grid lines and elevation datum and are to take into account structural items such as grade beams, column caps, and column drop slabs.
- .3 Begin to prepare such drawings immediately upon notification of acceptance of bid and award of Contract.

3.5. INSTALLATION OF ESCUTCHEON PLATES

- .1 Provide escutcheon plates suitable secured over all exposed conduits, ducts, armoured cable, etc., passing through finished building surfaces. A finished building surface is any surface with a factory finish or that receives a site applied finish.
- .2 Install the plates so that they are tight against the building surface concerned and ensure that the plates completely cover sleeves and/or openings, except where waterproof sleeves extend above floors, in which case the plate is to fit tightly around the sleeve.

3.6. INSTALLATION OF FASTENING AND SECURING HARDWARE

- .1 Provide fastening and securing hardware required for electrical Work to maintain installations attached to the structure or to finished floors, pads, walls, and ceilings in a secure and rigid manner capable of withstanding the dead loads, live loads, superimposed dead loads, and any vibration of the installed products.
- .2 Use fasteners compatible with structural requirements, finishes and types of products to be connected. Do not use materials subject to electrolytic action or corrosion where conditions are liable to cause such action.

- .3 Where floor, wall, or ceiling Construction is not suitable to support the loads, provide additional framing or special fasteners to ensure proper securement to the structure. Provide reinforcing or connecting supports where required to distribute loading to structural components.
- .4 Obtain written consent before using explosive actuated fastening devices. If consent is given comply with requirements of CAN3-Z166.1 and .2.
- .5 Do not attach fasteners to steel deck without written consent from the Consultant.

3.7. SUPPLY OF ACCESS DOORS

- .1 Supply access doors to give access to all electrical Work which may need maintenance or repair, but which is concealed in inaccessible Construction, except as otherwise specified herein or on the drawings.
- .2 Locate access doors as inconspicuously as possible in walls and partitions and arrange electrical Work such that it is clearly within view and accessible for inspection and servicing, and to suit access door locations shown on the reviewed and approved white prints of reflected ceiling plan and elevation drawings submitted as per Part 1 of this Section.
- .3 Group services to ensure the minimum number of access doors is required. Access doors will be installed by the trades responsible for the particular type of Construction in which the doors are required.
- .4 Submit a sample of each proposed access door for review prior to ordering.

3.8. ELECTRICAL WORK IDENTIFICATION

- .1 Identify all new/relocated electrical Work in accordance with existing identification standards at the site.
- .2 Identify all electrical Work, including conduit systems and wiring, as follows:
 - .1 the size and wording of identification nameplates must be approved by the Consultant.
 - .2 identification wording for equipment is to follow drawing nomenclature unless otherwise specified.
 - .3 secure nameplates to equipment with stainless steel screws unless such a practice is prohibitive, in which case use epoxy cement applied to cleaned surfaces
 - .4 locate nameplates in the most conspicuous and readable location.
 - .5 for multi-cell or multiple component equipment provide a main nameplate and a smaller nameplate for each cell or component
 - .6 where electrical Work is to be identified in conjunction with mechanical Work, coordinate with the mechanical trades to ensure identical tagging.

- .7 all identification wording is to be in English.
- .8 all identification and colour coding are to be indicated on “as-built” record drawings.
- .3 Terminal Cabinets, Pull Boxes, Junction Boxes, Etc.: Clearly identify terminal cabinets, main pull, and junction boxes by neatly spray painting the outside surface of the cover with a paint colour as specified below for conduit and conductor identification. Provide a nameplate on terminal boxes, main pull and junction boxes in communication systems.
- .4 Transformers: Transformer nameplated must identify the transformer capacity as well as primary and secondary voltages.
- .5 Branch Circuit Panelboards: Panelboard nameplates must identify the electrical source connected to the panelboard, each circuit breaker, and, neatly typed on the door directory card, the load connected to each breaker.
- .6 Motor Starters and Disconnect Switches: Provide nameplates for each motor starter and disconnect located in a motor control centre or on a motor starter panel, and on each individually mounted starter and disconnect provided as part of the electrical Work. Nameplates must also indicate the voltage and phase.
- .7 Luminaires On Emergency Circuits: Identify all luminaires on emergency circuit by means of a 15 mm ($\frac{1}{2}$ ”) diameter self-adhesive red label secured to the T-bar ceiling component adjacent to the luminaire, or if not in a T-bar ceiling, to the frame of the luminaire.
- .8 Lighting Switches & Receptacles: Identify each lighting switch and each receptacle by means of a permanent self-adhesive label indicating the source panelboard and circuit number and secured to the device faceplate.
- .9 Communication Equipment/Systems: Identify all “head end” equipment with nameplates and all “downstream” devices with self-adhesive labels indicating circuit numbers.
- .10 Warning Signs: Provide appropriately worded warning signs secured in place with stainless steel hardware in locations as follows:
 - .1 on all doors into transformer vaults
 - .2 on all doors into high voltage switchgear rooms
 - .3 on all collector bus enclosures
 - .4 on pad mounted transformer enclosures
 - .5 wherever else required by Code.
- .11 Conduit & Armoured Cable: Colour code conduit and armoured cable by means of 25 mm (1”) wide primary colour plastic adhesive backed tape or neatly applied suitable paint with, where scheduled, a 20 mm ($\frac{3}{4}$ ”) wide auxiliary colour at all points where the conduit or cable penetrates a wall, ceiling, floor, at 6 m (20’) intervals or at least

once in each room or accessible ceiling space, at each access door location, and elsewhere at 15 m (45') intervals. Unless otherwise indicated/specified, colours are to be as follows:

Service	Primary Colour	Secondary Colour
up to 250 volts	yellow	
250 to & including 600 volts	yellow	green
above 600 volts to 5 kV	yellow	blue
above 5 kV to 28 kV	yellow	red
telephone	green	
fire alarm	red	
emergency voice	red	blue
security systems	red	yellow
other communication systems	green	
isolated power	orange	

- .12 Wire & Cable Terminations: Identify both end of wire and cable terminations with the same unique number. Where numbers are not indicated or specified, assign a number, and record them.
- .13 Buried Cable/Duct Runs: Identify buried cable/duct runs under paved and landscaped areas with appropriate concrete markers, flush with grade at each change in direction, at least twice on runs less than 60 m (200') and on 60 m (200') centres on longer runs.
- .14 Overhead Wiring Service Poles: Unless otherwise indicated on the drawings identify poles with wording such as "HV#1". For wooden poles use 50 mm (2") high non-corrosive embossed aluminium pole markers. For concrete poles use non-corrosive metal plated secured to the pole with metal strapping.
- .15 Health Care Patient Care Area Circuits: For dedicated circuits provide identification as previously specified plus engraved "Dedicated Circuit" nameplates on the device faceplate or provide faceplates with "Dedicated Circuit" engraved wording. For 20 ampere corridor housekeeping receptacles provide "20A Housekeeping" nameplates on the device faceplate.
- .16 Distribution System Schematic Diagrams: Prepare AutoCAD, coloured, 1200 mm x 900 mm (48" x 36") schematic diagrams of electrical distribution systems to identify all equipment and circuits. Install framed and glazed diagrams in electrical rooms housing the system equipment. Confirm location prior to installation. Include reduced size copies of the diagrams in each copy of the O & M Manuals.

3.9. INSTALLATION OF TERMINAL BACKBOARDS

- .1 Provide properly sized plywood backboards for wiring terminals in terminal cabinets and enclosures where shown/specified/required.
- 3.10. GENERAL ELECTRICAL WORK TESTING
- .1 Perform testing in accordance with the Electrical Work Testing Section, and, in addition, any tests required by governing Codes, Standards.
- 3.11. BRANCH CIRCUIT BALANCING
- .1 Connect all branch circuits to panelboards so as to balance the actual loads (wattage) to within 5%. If required, transpose branch circuits to achieve this requirement.
 - .2 After the building is occupied and if requested by the Consultant, demonstrate that branch circuit balancing has been achieved.
- 3.12. FINISH PAINTING OF ELECTRICAL WORK
- .1 Finish paint exposed electrical Work to match the existing space conditions.
 - .2 Touch-up paint all damaged factory applied finishes on electrical Work products.
- 3.13. SUPPLY OF MOTOR STARTERS AND ACCESSORIES
- .1 Motor starters for mechanical equipment will be supplied as part of the mechanical Work.
- 3.14. ELECTRICAL WIRING WORK FOR MECHANICAL WORK
- .1 Unless otherwise specified or indicated, the following electrical wiring Work for mechanical equipment is to be done as part of the electrical Work:
 - .1 "line" side power wiring to motor starters or disconnect switches in motor control centres and starters or disconnects on motor starter panels, and "load" side wiring from the starters or disconnects to the equipment.
 - .2 mounting of individual starters, "line" side power wiring to individual wall mounted starters, and "load" side wiring from the starters to the equipment
 - .3 "line" side power wiring to pre-wired power and control panels and variable frequency drives, and "load" side power wiring from the panels and VFD's to the equipment
 - .4 provision of receptacles for plug-in equipment
 - .5 provision of disconnect switches for all motors that are in excess of 10 m (30') from the starter location, or that cannot be seen from the starter location, and all associated power wiring.
 - .6 all motor starter interlocking in excess of 24 volts.

- .7 wiring from motor winding thermistors in motors 30 HP and larger to motor starter contacts
- .8 provision of dedicated 120 volt, 15A-1P circuits terminated in junction boxes in mechanical equipment rooms for automatic control and building automation system wiring connections to be made as part of the automatic controls Work.
- .9 120-volt power connections to electrical receptacles integral with small ceiling exhaust fans, including wiring through light switches or speed controllers.
- .10 120 volt wiring connections to lighting fixture/switch combinations integral with air handling units.
- .11 120 volt wiring connections to duplex receptacles integral with air handling unit control panels.
- .2 Mechanical wiring Work not listed above or specified herein or on the drawings will be done as part of the mechanical Work in accordance with wiring requirements specified for the electrical Work.

3.15. INTERRUPTION TO AND SHUTDOWN OF ELECTRICAL SERVICES AND SYSTEMS

- .1 Co-ordinate all shutdown and interruption to existing electrical systems with the Owner. Generally, shutdowns may be performed only between the hours of 12:00 midnight Friday until 6:00 a.m. Monday morning.
- .2 Upon award of a Contract, submit a list of anticipated shut-down times and their maximum duration.
- .3 Prior to each shut-down or interruption, inform the Owner and Consultant in writing seventy-two hours in advance of the proposed shut-down or interruption and obtain written approval to proceed. Do not shutdown or interrupt any system or service without such written approval.
- .4 Perform Work associated with shut-downs and interruptions as continuous operations to minimize the shut-down time and to reinstate the systems as soon as possible, and, prior to any shut-down, ensure that all materials and labour required to complete the Work for which the shut-down is required are available at the site.

3.16. CUTTING, DRILLING, AND PATCHING

- .1 All cutting and patching of existing building surfaces required for electrical Work, including core drilling walls and slabs for piping, will be done as part of another Division of the Work and is excluded from the electrical Work.
- .2 Accurately and carefully mark out the location and extent of cutting or drilling required and co-ordinate with the trade(s) performing the Work. Note that the location and size of cut or drilled openings must be approved by the Consultant before the Work commences, and all cut or drilled openings must not be larger than is absolutely necessary.

3.17. CUTTING, DRILLING, AND PATCHING

- .1 Do all cutting, drilling, and patching of the existing building for the installation of your Work. Perform all cutting and drilling with proper tools and equipment. Confirm the exact location of cutting and drilling with the Consultant prior to commencing the cutting and/or drilling Work.
- .2 Patch surfaces, where required, to exactly match existing finishes using tradesmen skilled in the particular trade or application worked on.
- .3 Where new conduits, conductors, etc., pass through existing Construction, core drill an opening. Size openings to leave 12 mm ($\frac{1}{2}$ ") clearance around the product involved.
- .4 Prior to drilling or cutting an opening in poured concrete Construction, determine the location, if any, of existing services concealed in the Construction to be drilled or cut. X-ray or Ferro Scan Test the walls or slabs if required.
- .5 You will be responsible for the repair of any damage to existing services, exposed or concealed, caused as a result of your cutting, or drilling Work.
- .6 Where drilling is required in waterproof slabs, size the opening to permit snug and tight installation of a sleeve which is sized to leave 12 mm ($\frac{1}{2}$ ") clearance around the product involved. Provide a sleeve in the opening. Sleeves are to be Schedule 40 galvanized steel pipe with a flange at one end and a length to extend 100 mm (4") above the slab. Secure the flange to the underside of the slab and caulk the void between the sleeve and slab opening with proper non-hardening silicone base caulking compound to produce a water-tight installation.

3.18. PACKING AND SEALING CORE DRILLED OPENINGS

- .1 Pack and seal the void between the core drilled opening and the service insulation for the length of the opening as follows:
 - .1 non-fire rated interior Construction: pack openings in non-fire rated interior Construction with mineral wool and seal both ends of the opening with non-hardening silicone base caulking compound to produce a water-tight seal.
 - .2 exterior walls above grade: pack sleeves in exterior walls above grade with mineral wool and seal both ends of the sleeve's water-tight with approved non-hardening silicone base caulking compound unless mechanical type seals have been specified.
 - .3 exterior walls below grade: seal sleeves in exterior walls below grade (and any other wall where water leakage may be a problem) with link type mechanical seals as specified below.

3.19. FLASHING FOR ELECTRICAL WORK PENETRATING THE ROOF

- .1 Do all required flashing Work, including counterflashing, for electrical Work penetrating and/or set in the roof.
- .2 Perform flashing Work in accordance with requirements of drawing details, and requirements specified in Division 07.

3.20. CLEANING ELECTRICAL WORK

- .1 Refer to cleaning requirements specified in Division 01.
- .2 Clean all electrical Work prior to application for Substantial Performance of the Work.

3.21. MAINTAINING EQUIPMENT PRIOR TO ACCEPTANCE

- .1 Maintain all equipment in accordance with the manufacturer's printed instructions prior to start-up, testing and commissioning.

3.22. WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with requirements specified in Division 01.
- .2 Separate and recycle waste materials in accordance with requirements of Canadian Construction Association Standard Document CCA 81, A Best Practices Guide to Solid Waste Reduction.
- .3 Prepare a waste management and reduction plan and submit a copy for review prior to Work commencing at the site.
- .4 Place materials defined as hazardous or toxic waste in designated containers.
- .5 Ensure emptied containers are sealed and stored safely for disposal.

3.23. REQUIREMENTS FOR BARRIER-FREE ACCESS

- .1 Include for all applicable requirements for barrier-free access to electrical devices in accordance with governing Codes and Regulations, whether shown on the drawings, specified, or not.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. APPLICATION

- .1 This Section specifies requirements, criteria, methods, and execution for electrical demolition Work that are common to one or more electrical Work Sections, and it is intended as a supplement to each Section and is to be read accordingly.

1.3. SUBMITTALS

- .1 Submit documentation to confirm that all PCB material and/or equipment containing PCB material has been properly removed and disposed of as applicable.

1.4. REFERENCE STANDARD

- .1 Perform demolition Work in accordance with requirements of CAN/CSA-S350, Code of Practice for Safety in Demolition of Structures

PART 2 - PRODUCTS

- .1 Not Used.

PART 3 - EXECUTION

3.1. DISCONNECTION AND REMOVAL OF EXISTING ELECTRICAL WORK

- .1 Where indicated on the drawings, disconnect, and remove existing electrical Work, including hangers, supports, etc. Disconnect at the point of supply, remove obsolete connecting services, and make the system safe. Cut back obsolete conduit behind finishes and cap unless otherwise specified.
- .2 The scope and extent of the demolition or revision Work is only generally indicated on the drawings. Estimate the scope, extent, and cost of the Work at the site during the bidding period scheduled site visit(s).
- .3 Where deemed necessary by the Owner and Consultant, existing shafts, walls, and inaccessible ceilings will be opened by the Owner to permit site visit inspection of services to be removed/revised as part of the Work but usually concealed behind such Construction.
- .4 Claims for extra costs for demolition Work not shown or specified but clearly visible or ascertainable at the site during bidding period site visits will not be allowed.
- .5 If any re-design is required due to discrepancies between the electrical drawings and site conditions, notify the Consultant who will issue a Site Instruction. If, in the opinion of the Consultant, discrepancies between the electrical drawings and actual

site conditions are of a minor nature, the required modifications are to be done at no additional cost.

- .6 Where existing electrical services extend through or are in an area to serve items which are to remain, maintain the services in operation. Include for rerouting existing services concealed behind existing finishes and which become exposed during the renovation Work, so as to be concealed behind new or existing finishes.
- .7 Unless otherwise specified, remove from the site, and dispose of all existing materials which have been removed and are not to be relocated or reused.

3.2. HAZARDOUS MATERIALS AND WASTE

- .1 If hazardous materials and/or waste not listed in the Specification is found, stop the associated Work, and notify the Owner and Consultant immediately and await directions.

3.3. INTERRUPTION TO AND SHUTDOWN OF ELECTRICAL SERVICES AND SYSTEMS

- .1 Co-ordinate all shutdown and interruption to existing electrical systems with the Client. Generally, shutdowns may be performed only between the hours of 12:00 midnight Friday until 6:00 a.m. Monday morning and in accordance with Division 01.
- .2 Upon award of contract, submit a list of anticipated shut-down times and their maximum duration.
- .3 Prior to each shut-down or interruption, inform the Owner in writing seventy-two hours in advance of the proposed shut-down or interruption and obtain written approval to proceed. Do not shutdown or interrupt any system or service without such written approval.
- .4 Perform Work associated with shut-downs and interruptions as continuous operations to minimize the shut-down time and to reinstate the systems as soon as possible, and, prior to any shut-down, ensure that all materials and labour required to complete the Work for which the shut-down is required are available at the site.

3.4. 3.04 ROOFING WORK

- .1 Where roof revisions and/or replacements are part of the project, include for disconnecting, lifting, or temporarily removing electrical equipment and electrical connections to other roof mounted equipment as required to permit completion of the roofing Work, and for re-installing/re-connecting the equipment when the roofing Work is complete.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. SUBMITTALS

- .1 Test Reports: Submit signed test reports for all testing Work specified.
- .2 Approval Certificates: Submit Certificates of Approval as issued by governing authorities.

PART 2 - PRODUCTS

- .1 Not Used.

PART 3 - EXECUTION

3.1. GENERAL ELECTRICAL WORK TESTING REQUIREMENTS

- .1 Satisfactorily perform all testing required by governing authorities, Codes, Regulation, and the Specification, including general testing specified below. Prepare and sign test reports to confirm satisfactory completion of testing and submit as specified in Part 1 of this Section.
- .2 Perform testing to suit phasing of the Work, as applicable.
- .3 Leaks, Grounds, and Crosses: After luminaries, switches, receptacles, motors, signals, and similar equipment has been installed, whether or not the Work has been installed as part of the Work of this Division of the Specification or by other Divisions (telephone system excepted), test the Work to ensure that there are no leaks, grounds, or crosses.
- .4 Motor Operation: Test and establish proper motor rotation, measure full load running currents, and check overload elements. Report to the Consultant any discrepancies that are found. Existing motors that have been disconnected and reconnected as part of the electrical Work must be checked with rotation meter and be responsible for any damage caused by reverse rotation.
- .5 Branch Circuit Voltage Drop: Demonstrate to the Consultant that branch circuit voltage drop is within specified limits.

3.2. GROUNDING AND BONDING SYSTEM

- .1 Provide visual and mechanical inspection of the grounding and bonding system and verify that the system is in compliance with all requirements.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. APPLICATION

- .1 This Section specifies mounting height requirements that are common to electrical Work Sections of the Specification, and it is a supplement to each Section and is to be read accordingly.

PART 2 - PRODUCTS

2.1. MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting heights of equipment are not specified or indicated, verify with the Consultant prior to rough-in and installation.
- .3 Unless indicated otherwise on the drawings or within the Specifications, install electrical equipment at following heights.
 - .1 Local switches – no lower than 900mm and no higher than 1100mm
 - .2 Wall receptacles:
 - .1 General – 400mm (to bottom of receptacle)
 - .2 Above top of continuous baseboard heater – 200mm
 - .3 Above top of counters or counter splash backs – 175mm
 - .4 In mechanical rooms – 1000mm
 - .5 In equipment storage rooms – 1000mm
 - .3 Panelboards – 2000mm to top of panel and as required by Electrical Safety Code.
 - .4 Telephone and interphone outlets – 400mm (to bottom of receptacle)
 - .5 Wall mounted telephone and interphone outlets – no lower than 900mm and no higher than 1100mm
 - .6 Thermostats – 1200mm to the point of controls
 - .7 Fire Alarm stations – 1200mm to the top of point of operating action
 - .8 Wall Mounted Fire Alarm Audible Devices – 2300mm

- .9 Television outlets not mounted behind a wall mounted television – 400mm (to bottom of receptacle)
- .10 Wall mounted speakers – 2100mm
- .11 Clocks – 2100mm
- .12 Handicap pushbuttons – no lower than 900mm and no higher than 1100 mm
- .13 Wall mounted Exit Signs
 - .1 For ceilings up to 2500mm height – 2100mm
 - .2 For all ceilings greater than 2500mm – 2400mm.
- .14 Wall mounted Battery Packs and Emergency Heads
 - .1 For ceiling up to 2500mm height – 2100mm
 - .2 For all ceilings greater than 2500mm – 2400mm
- .15 Wall mounted occupancy sensors – no lower than 900mm and no higher than 1100mm
- .16 Wall mounted visible signal devices – entire lens shall be no less than 2000mm and no more than 2400mm.

Note: In all applications the visible signal device shall be located to provide optimal viewing by the occupants. There may be applications where mounting heights outside of the range described would be more suitable and should be reviewed based on space layout and brought up to Engineer as Construction progresses.
- .17 Top of remote annunciator and passive graphic panels shall be no more than 1800mm above finished floor.

PART 3 - EXECUTION

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. SUBMITTALS

- .1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for copper wire/cable conductors.

1.3. 1.02 QUALITY ASSURANCE

- .1 Grounding and bonding Work is to be in accordance with requirements of the following:
 - .1 CSA C22.2 No. 41, Grounding and Bonding Equipment (Tri-National Standard with UL 467)
 - .2 CSA C22.2 No. 0.4, Grounding and Bonding of Electrical Equipment
 - .3 Requirements of the Electrical Safety Authority and any other governing authority

1.4. 1.03 COORDINATION

- .1 Coordinate the installation of grounding hardware and conductors associated with concrete with the trades providing the concrete Work.

1.5. 1.04 FIELD QUALITY CONTROL REPORT

- .1 Submit written and signed report(s) indicating successful results of the ground continuity tests specified in Part 3.

PART 2 - PRODUCTS

2.1. GROUND CONDUCTORS

- .1 Unless otherwise specified and/or shown. Stranded un-tinned soft annealed copper wire, bare or green PVC insulated conforming to requirement of the Section entitled Wire and Box Connectors (0-1000volts).

2.2. GROUNDING AND BONDING CONNECTIONS

- .1 Below Grade: Equal to Erico International Corp. "CADWELD" exothermic welded connections.
- .2 Above Grade: Compression type connectors with zinc-plated fasteners and external tooth lock washers, or, if approved by the Consultant, exothermic Erico International Corp. "CADWELD" welded connections.

PART 3 - EXECUTION

3.1. GROUNDING AND BONDING

- .1 Perform all required grounding and bonding Work in accordance with the Contract Documents and requirements of governing Codes and Standards, including the Electrical Safety Authority.
- .2 Bond metallic conduits, boxes, cable tray, ducts, and non-current carrying metal parts of equipment together to form a continuous ground system. In electrical equipment rooms, solidly bond circuits, panelboards, conduits, equipment enclosures, and other equipment to perimeter ground bus using bronze connectors and hardware.
- .3 Protect exposed conductors from injury. Install underground conductors a minimum of 450 mm (18") below grade.
- .4 Use tinned copper conductors for aluminium structures.
- .5 Do not use bare copper conductors adjacent to un-jacketed lead sheath cables.

3.2. GENERAL PRIMARY GROUNDING AND BONDING REQUIREMENTS

- .1 Grounding and bonding Work associated with primary electric service Work is to be performed only by qualified journeyman electricians employed by the subcontractor doing the primary electric service Work.
- .2 Provide a separate ground conductor in all PVC conduits.

3.3. CABLE SHEATH GROUNDING

- .1 Bond single conductor metallic sheathed cables together at one end only. Break the sheath continuity in an approved manner and provide #6 AWG flexible copper ground conductor soldered (not clamped) to the cable sheath.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. SUBMITTALS

- .1 Product Data: If requested, submit product data sheets for products specified in this Section.
- .2 Samples: If requested, submit samples of products specified in this Section.

PART 2 - PRODUCTS

2.1. SPLITTER TROUGH

- .1 Formed #16-gauge steel Type 1 splitter trough in accordance with CSA C22.2 No. 76, Splitters, finished inside and outside with ANSI 61 grey heat cured powder epoxy paint, and complete with welded seams ground smooth, various size knockouts on each side, back mounting holes, removable doors with stainless steel hinges and hinge pins, terminal blocks for conductor connections, a single point ground lug.
- .2 Enclosures: Unless otherwise specified, enclosures are to be in accordance with the following NEMA/EEMAC ratings:
 - .1 all enclosures located in sprinklered areas – Type 2
 - .2 all enclosures except as noted above – Type 1

2.2. PULL BOXES AND JUNCTION BOXES

- .1 Each box is to be CSA certified, sized to suit the number and size of conduit and conductors, and complete with connecting and securing facilities. Unless otherwise specified, pull boxes and junction boxes are to be as follows:
 - .1 galvanized or prime coat plated steel, suitable in all respects for the application and complete with screw-on or hinged covers as required and connectors suitable for the connected conduit.
 - .2 “Condulet”, threaded galvanized cast iron or cast aluminium pull boxes and junction boxes of an exact type to suit the application, each complete with screw-on gasketed cover.
 - .3 rigid plastic (PVC), junction boxes and access fittings with solvent weld type joints and screw-on PVC covers
 - .4 equal to Square D (Schneider Canada) Catalogue No. 970 cast bronze waterproof
 - .5 junction box for underwater lighting.

PART 3 - EXECUTION

3.1. INSTALLATION OF SPLITTER TROUGH

- .1 Provide all required splitter trough in accordance with drawing plans, schedules, details, and requirements of the Specification.
- .2 Rigidly secure that the splitter trough in place, level and plumb.
- .3 Ensure that the splitter trough itself, and all branch circuits are properly identified.

3.2. INSTALLATION OF PULL BOXES AND JUNCTION BOXES

- .1 Provide pull boxes in conduit systems wherever shown on the drawings, and/or wherever necessary to facilitate conductor installations. Generally, conduit runs exceeding 30 m (100') in length, or with more than three 90° bends, are to be equipped with a pull box installed at a convenient and suitable intermediate accessible location.
- .2 Provide junction boxes wherever required and/or indicated on the drawings.
- .3 Unless otherwise specified, boxes are to be as follows:
 - .1 in rigid conduit and EMT inside the building – stamped galvanized or prime coated steel.
 - .2 in exterior rigid conduit – “Condulet” cast aluminium gasketed boxes unless otherwise noted.
 - .3 in plastic conduit – rigid PVC boxes
 - .4 in bronze underwater conduit – cast bronze boxes.
- .4 All pull boxes and junction boxes must be accessible after the Work is complete.
- .5 Accurately locate and identify all concealed pull boxes and junction boxes on “as-built” record drawings.
- .6 Cover boxes in fire walls with aluminium tape and seal with caulking.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. SUBMITTALS

- .1 Product Data: If requested, submit product data sheets for products specified in this Section.
- .2 Samples: If requested, submit samples of products specified in this Section.

PART 2 - PRODUCTS

2.1. OUTLET BOXES

- .1 Each box is to be CSA certified, suitable in all respects for the application, and be complete with suitable securing lugs, connectors suitable for the connected conduit, knockouts, and, where necessary, suitable plaster rings, concrete rings, covers and any other required accessory. Unless otherwise specified, outlet boxes are to be as follows:
 - .1 stamped, electro-galvanized steel outlet boxes.
 - .2 zinc coated cast malleable iron or cast aluminum “FS and “FD” boxes with threaded inlet/outlet hubs.
 - .3 rigid PVC outlet boxes
 - .4 equal to Hubbell Canada Inc. UL/ULC or ETL or listed fully adjustable both vertical and angular, formed galvanized cast iron, round, rectangular, or square as required flush concrete floor boxes complete with adjustable collars and brass screw-on hinged flip-open cover with provisions for installation of duplex power receptacles, telephone data jacks, and, for boxes containing both power and communication system outlets, proper barriers are to be provide.

PART 3 - EXECUTION

3.1. INSTALLATION OF OUTLET AND CONDUIT BOXES

- .1 Provide an outlet box or back box for each luminaire, wiring device, telephone outlet, fire alarm system component, communications systems components, and all other such outlets.
- .2 Stamped Galvanized Steel: Outlet boxes flush mounted in interior Construction, surface mounted in concealed interior locations, and surface mounted in exposed interior locations where the connecting conduit is EMT are to be stamped galvanized steel outlet boxes unless otherwise noted.

- .3 “FS” and “FD” Series Boxes: Outlet boxes for surface mounted for exterior lighting, receptacles, and other device outlets, boxes flush mounted in exterior building surfaces, and boxes mounted in interior device locations where the connecting conduit is rigid, and for boxes in perimeter walls where insulation and vapour barrier is present, are to be “FS” or “FD” Series cast boxes unless otherwise noted, cast iron inside the building, cast aluminium outside the building.
- .4 Outlet boxes for special wiring devices, for special equipment and special applications if required, are specified hereinafter in other Sections or on the drawings.
- .5 The size and arrangement of outlet boxes are to suit the device which they serve.
- .6 Generally, mounting heights and locations for outlets are indicated on the drawings, however, confirm the exact location and arrangement of all outlets prior to roughing-in. Architectural drawings and the Consultant’s instructions have precedence over electrical drawing diagrammatic layouts and specified mounting height and locations. In addition, abide by the following requirements:
 - .1 locate flush mounting boxes in masonry walls to require cutting of the masonry unit corner only, and coordinate masonry cutting to achieve a neat opening.
 - .2 position outlet boxes to locate luminaires as shown on reflected ceiling plans.
 - .3 coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- .7 Do not install outlet or black boxes “back-to-back” in walls and partitions. Stagger such outlets and seal against noise transmission with acoustic insulation. “Thru-wall” type boxes will not be permitted for any application.
- .8 Where boxes are multi-ganged or grouped together, mount boxes level and spaced consistently.
- .9 Temporarily pack all open boxes located in concrete and masonry to prevent debris from entering the box.
- .10 Include all costs for installed boxes that have not been covered by wall/ceiling finishes, to be relocated up to 1 m (3’) to suit final device location coordination.
- .11 Provide blank cover plates over all boxes left empty for future installation of devices. Clearly identify each box as to its intended use to the Consultant’s approval. Generally, blank cover plates are to be stainless steel.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. SUBMITTALS

- .1 Product Data: Submit product data sheets for all products where submittal is specified in Part 2 or Part 3 of this Section.
- .2 Colour Coated EMT Colour Chart: Submit the colour coated EMT manufacturer's standard colour chart for colour selection(s) by the Consultant.
- .3 Drawing(s) of Conduit Locations/sizes In Structural Poured Concrete: As specified in Part 3 of this Section, submit drawings to indicate the proposed location, size, and length of run for conduit proposed to be installed in structural poured concrete Work.

PART 2 - PRODUCTS

2.1. EMT

- .1 Galvanized steel to CSA C22.2 No. 83, Electrical Metallic Tubing, complete with factory made bends where site bending is not possible, and joints and terminations made with steel couplings and set screw type connectors, concrete tight where required.

2.2. FLEXIBLE GALVANIZED STEEL LIQUID-TIGHT CONDUIT

- .1 Flexible galvanized steel liquid-tight conduit to CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit, complete with Ideal Industries Inc. "Steel Tough" liquid-tight connectors at terminations.

2.3. FLEXIBLE GALVANIZED STEEL CONDUIT

- .1 Galvanized steel flexible conduit to CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit, complete with proper and suitable squeeze type connectors at terminations.

2.4. RIGID PVC CONDUIT

- .1 Rigid PVC conduit to CSA C22.2 No. 211.1, Rigid Types EB1 and DB2/ES2 PVC Conduit, FT-4 rated, complete with site made heat gun bends for conduit to and including 50 mm (2") diameter, factory made fittings for conduit larger than 50 mm (2") diameter, solvent weld joints, factory made expansion joints where required, and terminations made with proper and suitable connectors and adaptors.

2.5. FISH CORD

- .1 Polyethylene or nylon fish cord/tape with cable pull accessories to suit the application.

PART 3 - EXECUTION

3.1. INSTALLATION OF CONDUIT

- .1 Refer to the article entitled General Conduit and Conductor Installation Requirements in the electrical Work Section entitled Basic Electrical Materials and Requirements.
- .2 Ensure that all open empty conduit ends are properly protected against dirt and debris during the Construction process.

3.2. CONDUIT INSTALLATION REQUIREMENTS

- .1 Unless otherwise specified, provide conduit for all conductors except armoured cable, mineral insulated fire rated cable, and except where cable tray, cable duct, or a similar raceway is used.
- .2 Conduit Types: Conduit is to be as follows:
 - .1 for main distribution wiring in electrical rooms and similar areas – rigid galvanized steel
 - .2 for conduit exposed outside the building, except where rigid PVC conduit is permitted – rigid galvanized steel.
 - .3 for short (minimum 450 mm (18”), maximum 600 mm (24”), with a 180° loop wherever possible) runs of conduit to electric motors, distribution transformers, and vibration isolated equipment – flexible galvanized steel liquid-tight conduit.
 - .4 for branch circuit conductors outside the building at roof level – rigid PVC
 - .5 for all conduit except as specified above – EMT.
- .3 Conduit Fittings: Unless otherwise specified, conduit fittings are to be of the same material as the conduit and suitable in all respects for the application. Provide proper adaptors for joining conduit of different materials.
- .4 Conduit Bends: Site made bends for conduit must be made using proper bending equipment, bends must maintain the full conduit diameter with no kinking, and conduit finishes, and lining must not flake or crack when the conduit is bent.
- .5 Site Cutting Conduit: Cut square and ream all site cut conduit ends.
- .6 Conduit Threads: Site cut rigid steel conduit using proper thread cutting equipment, in an approved area. Protect the area and building surfaces from being soiled/damaged by the threading process. Clean and lubricate threads and coat threads with red lead or other zinc rich coating.
- .7 Conduit Sizes: Generally, conduit is sized on the drawings. Conduit not sized on the drawings is to be sized in accordance with the governing Codes/Regulations. The

sizes of branch circuit conductors shown/specified are minimum sizes and must be increased to suit length of run and voltage drop, and where this occurs, increase the conduit size to suit. Do not use conduit less than 20 mm (3/4") diameter.

- .8 Empty Conduit: Ensure that all conduit left empty for future wiring is clean, capped, and properly identified. Provide end bushings and fish cord in all such conduit.
- .9 Empty Conduit At Panelboards: Where a suspended ceiling occurs, provide 4, empty, 20 mm (3/4") diameter conduits from each flush wall mounted panelboard terminated in the suspended ceiling above, capped and identified.

3.3. SEALED CONDUIT PENETRATIONS

- .1 For isolation rooms, any conduit penetration any surface of the room is to be sealed with a suitable elastomeric and intumescent material to ensure complete isolation of the room/area. The sealing material must be non-hazardous and suitable in all respects for the specific application, including a fire rating if required. Submit product data for the proposed sealing material as well as WHMIS sheets and product installation instructions.

3.4. CONDUIT SUPPORT

- .1 Surface Mounted & Suspended Single/Double Conduit Runs: Support and secure single and double runs of conduit at support spacing in accordance with Code requirements by means of galvanized steel pipe straps, conduit clips, ring bolt type hangers with galvanized steel hanger rods, or by other approved manufactured devices.
- .2 Support of Multiple Conduit Runs: Support multiple conduits runs by means of Electrovert Ltd. "CANTRUSS" or Burndy Ltd. "FLEXIBLE" conduit racks and galvanized steel rods with support spacing to suit requirements of the smallest diameter conduit in the group.

END OF SECTION

PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with Division 01 - General Requirements and Section 26 05 00 – Electrical Work General Instructions.

1.2. SUBMITTALS

- .1 Product Data: Submit product data sheets for all products specified in this Section. Indicate compatibilities and limitations, and application instructions.
- .2 Samples: If requested, submit identified conductor samples.
- .3 MSDS Sheets: Submit Material Safety Data Sheets for conductor pulling lubricants.

PART 2 - PRODUCTS

2.1. DISTRIBUTION AND BRANCH CIRCUIT CONDUCTORS

- .1 Conductors to and including No. 10 AWG are to be solid. Conductors larger than No. 10 AWG are to be stranded. All conductors are to be constructed from 98% conductive copper and are to be approved for 600 volts. Conductors are to be colour coded, factory identified on the insulation with the manufacturer's name, conductor size and metal, voltage rating, and CSA type and designation. Conductors are to be as follows:
 - .1 "T-90 Nylon" single conductor in accordance with CSA C22.2 No. 75, Thermoplastic-Insulated Wires and Cables, 90° C (195° F) rated, PVC insulated, and nylon covered.
 - .2 "RW-90" single conductor in accordance with CAN/CSA C22.2 No. 38, Thermoset-Insulated Wires and Cable, 90° C (195° F) rated, X-link polyethylene insulated
 - .3 "TWU" single conductor in accordance with CSA C22.2 No. 75, -40° C (-40° F) rated, PVC insulated.
 - .4 "AC90" flexible cable to CSA C22.2 No. 51, Armoured Cable, with 90° C (195° F) rated, X-linked polyethylene insulated conductors, a concentric ground conductor, and an interlocking aluminium armour jacket.

2.2. LOW VOLTAGE (24 VOLT) CONDUCTORS

- .1 "T-90" or "RW90" stranded copper conductors as specified above.
- .2 Equal to Nexans Canada "Securex II" FAS/LVT/FT1300 volt wire to CSA C22.2 No. 208, Fire /Alarm and Signal Wire, 105° C (220° F) rated, consisting of solid copper conductors (stranded for control wiring), flame retardant PVC insulation, an aluminium/Mylar optional shield with a #22 AWG tinned copper insulation and a drain

wire, and, if required for the application, interlocking aluminium armour with or without an overall jacket.

2.3. CONNECTORS

- .1 Conductors In Conduit: Except as noted, equal to Ideal Industries Inc. “Wing Nut” CSA certified; 60 volt rated pressure type twist connectors.
- .2 Conductors 3/0 AWG and Larger: Long barrel, double crimp, compression type lug connectors, unless otherwise specified.
- .3 Armoured Cable: Except as noted, proper squeeze type connectors and plastic anti-short bushings at terminations in accordance with requirements of CSA C22.2 No. 18.3, Conduit, Tubing and Cable Fittings.
- .4 Mineral Insulated Conductors: Tyco/Pyrotenax “Pyropak” connectors, complete with brass plates with drilled and tapped mounting holes for connections to ferrous cabinets.
- .5 Corflex/Teck Cable: Connector and termination hardware supplied by the cable manufacturer to suit the application.

2.4. CONDUCTOR PULLING LUBRICANT

- .1 Equal to Ideal Industries Inc. “Yellow 77” or “ClearGlide”, as required.
- .2 French Chalk or Talcum Powder conductor pulling lubricant.

PART 3 - EXECUTION

3.1. GENERAL

- .1 Conform to the following conductor installation requirements:
 - .1 Conductor Routing: Conductor routing indicated on the drawings is schematic and approximate. Determine exact routing and conductor lengths at the site. Route conductors to avoid interference with other Work. Unless otherwise specified or shown install conductors parallel to building lines.
 - .2 Conductor Pulling: When pulling conductors into conduit use lubricant and ensure that the conductors are kept straight and are not twisted. For isolated power centre “load” side power wiring, use only French Chalk pulling lubricant.
 - .3 Securing/Supporting Conductors: Conform to the following requirements:
 - .1 neatly secure exposed conductors in equipment enclosures with proper supports and/or ties
 - .2 support flexible armoured cable in ceiling spaces and stud walls with steel two-hole cable straps to Code requirements.

- .4 Conductor Splicing: Generally, conductor splicing is not permitted unless otherwise approved by the Consultant, and if approved splicing is subject to the following conditions:
 - .1 splicing is permitted to extend existing conductors.
 - .2 for thermoplastic insulated conductors, splices are to be made within an approved electrical box with mechanical compression connectors to suit the type and size of conductors, and the box(es) are to be properly identified and locations are to be indicated on “as-built” drawings.
 - .3 do not splice mineral insulated “MI” cable.
 - .4 do not splice “Corflex” cable unless justified by cable pulling tension calculations and when approved by the Consultant, and, if approved, locate splices where directed by the Consultant

3.2. INSTALLATION OF DISTRIBUTION AND BRANCH CIRCUIT CONDUCTORS

- .1 Provide all required conductors.
- .2 Non-Fire Rated Conductors: Unless otherwise specified herein or on the drawings, non-fired rated conductors are to be used as follows:
 - .1 conductors underground inside or outside the building, and in non-climate-controlled areas – TWU
 - .2 unless otherwise specified, conductors in accessible ceiling spaces, within stud wall Construction, and in furniture systems to luminaries and wiring devices – AC90 (BX) flexible armoured cable, maximum 6 m (20’) run permitted.
 - .3 for conductors except as specified above or elsewhere in the Specification or on the drawings – T90 Nylon or RW90
- .3 Conductor Sizing: Generally, conductor sizes are indicated on the drawings. Unless otherwise specified, do not use conductors smaller than No. 12 AWG in systems over 30 volts. Unless otherwise specified, do not use conductors smaller than No.6 AWG for exterior luminaire wiring. Conductor sizes indicated on the drawings are minimum sizes and must be increased, where required, to suit length of run and voltage drop in accordance with the voltage drop schedule found at the end of this Section.
- .4 Conductor Colour Coding: Unless otherwise specified, colour code conductors to identify phases, neutral, and ground by means of self-laminating coloured vinyl tape, coloured conductor insulation, or properly coloured plastic discs. Colours are to be as follows:
 - .1 phase A – red
 - .2 phase B – black

- .3 phase C – blue
- .4 neutral – white
- .5 control – orange

MAX. BRANCH WIRING DISTANCE FOR 120 VOLT SYSTEM AT 2% VOLTAGE DROP

Wire Size	Breaker Size (AMPERES)	15	20	30	40	50	60	70	80	100
	MAX LOAD AT 80% (AMPERES)	12	16	24	32	40	48	56	68	80
No 12.		16.8	12.2							
No 10		25.9	19.0							
No. 8		39.6	30.4	12.9						
No. 6		62.4	47.2	32.0	23.6	19.0	16.0			
No.4		99.0	73.1	50.2	38.1	30.4	24.3	21.3	19.0	
No. 2			114.3	77.2	57.9	47.2	38.8	33.5	28.9	22.8
No. 1				96.0	73.1	57.9	47.2	42.6	36.5	27.4
No.1/0					85.3	68.5	56.3	48.7	41.9	33.5
No. 2//0					102.8	80.7	67.0	57.9	50.2	40.3
No. 3/0						95.2	79.2	68.5	59.4	47.2
No. 4/0							92.9	79.2	70.1	56.3
250 MCM							102.8	86.8	76.2	60.9
300 MCM								100.5	88.3	70.1

.5 NOTE: DISTANCES INDICATED IN METRES FROM PANEL TO LOAD FOR SINGLE PHASE

MAX. BRANCH WIRING DISTANCE FOR 120 VOLT SYSTEM AT 3% VOLTAGE DROP

Wire Size	Breaker Size (AMPERES)	15	20	30	40	50	60	70	80	100
	MAX LOAD AT 80% (AMPERES)	12	16	24	32	40	48	56	68	80
No 12.		24.4	18.3							
No 10		38.1	29.0	19.1						
No. 8		59.4	44.2	30.5	22.9					
No. 6		91.4	70.1	47.2	35.1	28.2	23.6			
No.4			109.7	73.2	54.9	42.7	38.1	32.0	27.4	
No. 2				114.3	85.3	68.6	57.9	50.3	41.1	35.0
No. 1					103.6	85.3	73.2	61.0	54.9	43.4
No.1/0					128.0	102.9	85.3	73.2	64.0	48.8
No. 2/0						122.9	100.6	86.9	74.7	60.9
No. 3/0							118.1	102.1	88.4	70.1
No. 4/0								120.4	102.9	83.8
250 MCM									114.3	91.4
300 MCM										103.6

END OF SECTION

1 GENERAL

1.01 SUBMITTALS

- .1 Product Data: Submit product data sheets for all products specified in this Section.
- .2 Panelboard Door Keys: Submit an identified key (minimum 3) for panelboards equipped with doors.

1.02 QUALITY ASSURANCE

- .1 Distribution panelboards are to be rated to interrupt and withstand short circuit faults greater than the available fault current. Indicate conformance with this requirement on product data sheets submitted for review.

2 PRODUCTS

2.01 DISTRIBUTION PANELBOARDS

- .1 General Re: Panelboards: Distribution panelboards are to be dead front, factory assembled panelboards designed for sequence phase connection of branch circuit devices, as per the drawing schedule and plans, and in accordance with requirements of CAN/CSA- C22.2 No. 29, Panelboards and Enclosed Panelboards Industrial Products. Comply with OESC Rule 14-014 with regards to series rated combinations of over-current protective devices and ensure that equipment in which the lower rated devices are installed are marked with a series combination interrupting rating at least equal to the available fault current. Each panelboard is to be complete with:
 - .1 silver plated, electrical grade, 95% conductivity copper bus mains for the full length of each enclosure
 - .2 main and branch circuit conductor solderless lugs approved for copper conductors
 - .3 neutral bus and main lugs at the same end, and a removable cover for main lugs
 - .4 for panelboards in Elevator and/or Escalator Machine Rooms, hardware to permit padlocking the switch or breaker in the open position
- .2 Panelboard Enclosures: Panelboard enclosures, unless otherwise specified, are to be EEMAC 2 sprinkler-proof, constructed of Code gauge galvanized sheet steel, equipped with drip shields, and factory cleaned, primed, and finished with ASA-61 light gray equipment enamel. Each enclosure is also to be equipped with:
 - .1 wiring gutter space on all sides in accordance with CAN/CSA-C22.2 No.29 requirements

- .2 space for future breakers/switches as applicable and as per the drawing schedule, and where spare breaker space is scheduled, breaker connector kits
- .3 for panelboards in areas other than secure Electrical, etc., Rooms, a concealed hinged door and flush latch with keyed alike lock
- .4 for free-standing floor mounted panelboards, reinforcement as required for a rigid enclosure
- .3 Circuit Breaker Panelboards: Breakers are to be moulded case, bolt-on breakers in accordance with CSA-C22.2 No. 5, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures, calibrated for operation in a 40° C (150° F) ambient temperature, sized in accordance with the drawing schedules, and complete with:
 - .1 a top main breaker
 - .2 for breakers 225 amperes and larger, a solid-state adjustable trip unit with long time, short time, and instantaneous time functions and time delays, set at ratings in accordance with the distribution coordination study
- .4 Switch and Fuse Panelboards: Fusible switches are to be quick-make, quick-break, visible contact bolt-on switches in accordance with CSA-C22.2 No. 5, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures, sized in accordance with the drawing schedules, and complete with:
 - .1 a top main switch
 - .2 operating handles which protrude through the dead front enclosure, interlocked with the switch mechanism, and equipped with facilities for padlocking in either the "ON" or "OFF" position
 - .3 fuse clips, and HRC fuses as per the drawing schedule
- .5 Modifications & Accessories: Panelboards are to be factory equipped with modifications and accessories as follows:
 - .1 200% rated neutral
 - .2 insulated ground bus assembly
 - .3 isolated ground bus assembly
 - .4 sub-feed lugs
 - .5 through-feed lugs
 - .6 entry plates for Corflex cable
 - .7 a barriered main breaker or switch

- .8 a main breaker/switch through the cover key interlock
 - .9 an electrically held contactor in the mains, installed in a separate compartment with removable cover
 - .10 a shunt trip for the main breaker
 - .11 undervoltage release for the main breaker
 - .12 an alarm switch for the main breaker
 - .13 a surge protection package with audible alarm and silence button, From “C” relay contact, and EMI/RFI filtering providing 50 dB noise attenuation at 100 kHz
- .6 Acceptable Manufacturers: Acceptable manufacturers are:
- .1 Eaton Canada
 - .2 Schneider Electric Canada
 - .3 Siemens Electric Canada

3 EXECUTION

3.01 INSTALLATION OF DISTRIBUTION PANELBOARDS

- .1 Provide distribution panelboards where shown. Ensure adequate operation and maintenance clearance on all sides of each panelboard as per Code requirements.
- .2 Wall mount panelboards independent of connected conduit.
- .3 Secure each free-standing panelboard, level and plumb, to a concrete housekeeping pad.
- .4 Connect neutral conductors to common neutral bus with respective neutral identified.
- .5 Identify each panelboard and each panelboard component with an engraved Lamacoid nameplate in accordance with requirements of the Section entitled Basic Electrical Materials and Methods. Confirm nameplate wording with the Consultant prior to manufacture. Include a printed circuit directory card in a frame with acetate cover.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Section Includes:

- .1 Materials and installation for fire alarm systems.
- .2 Control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating general two-stage alarm, supervising system continuously, actuating zone annunciators, and initiating trouble signals.
- .3 Trouble signal devices.
- .4 Power supply facilities.
- .5 Manual alarm stations.
- .6 Automatic alarm initiating devices.
- .7 Audible signal devices.
- .8 End-of-line devices.
- .9 Annunciators.
- .10 Visual alarm signal devices.
- .11 .Ancillary devices.

1.02 REFERENCES

.1 Government of Canada

- .1 TB OSH Chapter 3-03, 1997-01-28, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-03, Standard for Fire protection Electronic Data Processing Equipment.
- .2 TB OSH Chapter 3-04, 1994-12-22, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-04, Standard for Fire Alarm Systems.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 .Material Safety Data Sheets (MSDS).

.3 Underwriter's Laboratories of Canada (ULC)

- .1 CAN/ULC-S524-2001, Standard for the Installation of Fire Alarm Systems.

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- .2 CAN/ULC-S525-1999, Audible Signal Device for Fire Alarm Systems.
 - .3 CAN/ULC-S526-2002, Visual Signal Devices for Fire Alarm Systems.
 - .4 CAN/ULC-S527-1999, Control Units.
 - .5 CAN/ULC-S528-1991, Manual Pull Stations for Fire Alarm Systems.
 - .6 CAN/ULC-S529-2002, Smoke Detectors for Fire Alarm Systems.
 - .7 CAN/ULC-S530-M1991, Heat Actuated Fire Detectors for Fire Alarm Systems.
 - .8 CAN/ULC-S531-2002, Standard for Smoke Alarms.
 - .9 CAN/ULC-S536-S537-2004, Burglar and Fire Alarm Systems and Components.
- .4 National Fire Protection Agency
 - .1 NFPA 72-2002, National Fire Alarm Code.
 - .2 NFPA 90A-2002, Installation of Air Conditioning and Ventilating Systems.
- 1.03 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, Specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Shop drawings: stamped and signed by professional engineer registered or licensed Ontario, Canada.
 - .2 Include:
 - .1 Layout of equipment.
 - .2 Zoning.
 - .3 Complete wiring diagram, including schematics of modules.

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- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .3 Manufacturer's Field Reports: manufacturer's field reports specified.
 - .4 Closeout Submittals:
 - .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.
 - .2 Authority of Jurisdiction will delegate authority for review and approval of submittals required by this Section.
 - .3 Submit to Authority of Jurisdiction 2 sets of approved submittals and drawings immediately after approval but no later than 15 working days prior to final inspection.
 - .4 Submit following:
 - .1 Manufacturer's Data for:
 - .1 Duct smoke detectors.
 - .2 Wiring.
 - .3 Ground rods.
 - .4 Conduit.
 - .5 Outlet boxes.
 - .6 Fittings for conduit and outlet boxes.
 - .7 Surge suppression devices.
 - .8 Mark data which describe more than one type of item to indicate which type will be provided.
 - .9 Submit 1 original for each item and clear, legible, first-generation photocopies for remainder of specified copies.
 - .2 System wiring diagrams:

- .1 Submit complete wiring diagrams of system showing points of connection and terminals used for electrical connections in the system.
- .2 Show modules, relays, switches and lamps in control panel.
- .3 Test Reports:
 - .1 Preliminary testing:
 - .1 Final acceptance testing.
 - .2 Submit for inspections and tests specified under Field Quality Control.

1.04 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in fire alarm system installations with 5 -years documented experience approved by manufacturer.
 - .2 Provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to project personnel.
- .3 System:
 - .1 To TB OSH Chapter 3-04.
 - .2 Subject to Fire Commissioner of Canada (FC) approval.
 - .3 Subject to FC inspection for final acceptance.
 - .4 To Canadian Forces Fire Marshal approval.
- .4 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .5 Maintenance Service:
 - .1 Provide one year's free maintenance with two inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC-S536. Submit inspection report to Departmental Representative DCC Representative Consultant.

1.05 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 20 - Construction Waste Management.

2 PRODUCTS

2.01 MATERIALS

.1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.

.1 Power supply: to CAN/ULC-S524.

.2 Control unit: to CAN/ULC-S527. .

.3 Smoke detectors: to CAN/ULC-S529.

.4 Smoke alarms: to CAN/ULC-S531.

2.02 SYSTEM OPERATION

.1 Connect new devices to existing fire alarm system

2.03 CONTROL PANEL

.1 Existing fire alarm control panel is Notifier: Onyx Series NFFS2-640

2.04 DUCT SMOKE DETECTORS

.1 Provide detectors installed in ducts of ionization photoelectric type and listed by ULC duct installation.

.2 Provide integral control and power modules required for operation with main control panel.

.3 Ensure detectors and associated modules are compatible with main control panel and suitable for use in supervised circuit.

- .4 Detector circuits: 4-wire type where detector operating power is transmitted over conductors separate from initiating circuit. Malfunction of electrical circuits to detector or its control or power modules to cause operation of system trouble signals.
- .5 Provide a separate, fused power circuit for each smoke detection initiating circuit.
- .6 Failure of power circuit: indicated as a trouble condition on corresponding initiating circuit.
- .7 Provide duct detectors in accordance with NFPA 90A.
- .8 Provide duct detectors with approved duct housing, mounted exterior to duct, with perforated sampling tubes extending across width of duct.
- .9 Activation of duct detectors to cause shutdown of associated air handling unit annunciation at control panel and tripping of master box transmitter and sounding of building evacuation alarms.
- .10 Provide detectors with visible indicator lamp that flashes when detector is in normal standby mode and glows continuously when detector is activated.
- .11 Provide remote indicator lamp for each detector.
- .12 Permanently label remote indicator with description number of associated air handling unit(s).
- .13 Provide each detector with remote test switch. Mount switch not more than 1.8 m above finished floor.
- .14 Permanently label test switch with description number of associated air handling unit(s).

2.05 END-OF-LINE DEVICES

- .1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel and remotely as indicated. .

2.06 CONDUIT

- .1 Rigid Steel Conduit:
 - .1 Zinc-Coated.
- .2 Intermediate Metal Conduit (IMC):
 - .1 Zinc-coated steel only.

- .3 Electrical Metallic Tubing (EMT):
- .4 Surface Metal Raceway and Fittings:
 - .1 Two-piece painted steel.
 - .2 Totally enclosed snap-cover type.

2.07 WIRING

- .1 Wire for 120 V circuits: No. 12 AWG minimum solid copper conductor.
- .2 Wire for low voltage DC circuits: No. 14 AWG minimum solid copper conductor
- .3 Wire to remote annunciators: No. 18 AWG minimum solid copper conductor.
- .4 Wire for connection to base telegraphic alarm loop: No. 10 12 AWG minimum solid copper conductor.
- .5 Insulation 75 degrees C minimum with nylon jacket.
- .6 For underground or wet allocations cable from control panel to master box auxiliary transmitter and to telegraphic loop: type UF.
- .7 Colour code wiring.

2.08 SURGE SUPPRESSION

- .1 Provide line voltage and low voltage surge suppression devices to suppress voltage transients which might damage control panel and transmitter components.
- .2 Mount suppressors in separate enclosure(s) adjacent to control panel and transmitter unless suppressors are specifically UL approved for mounting inside control panel and transmitter provided and approved for such use by control panel and transmitter manufacturers.

2.09 LINE VOLTAGE SURGE SUPPRESSOR

- .1 Suppressor : ULC approved with maximum 330 volt clamping level and maximum response time of 5 nanoseconds.
- .2 Suppressor: multi-stage Construction which includes inductors and silicon avalanche zener diodes.
- .3 Equip suppressor with long-life indicating lamp light emitting diode neon lamp which extinguishes upon failure of protection components.
- .4 Fuses: externally accessible.

- .5 Wire in series with incoming power source to protected equipment using screw terminations
- 2.10 LOW VOLTAGE SURGE SUPPRESSOR
- .1 Provide surge suppression for circuits which leave building shell.
 - .2 When circuits interconnect 2 or more buildings, provide arrestor at circuit entrance to each building.
 - .3 Suppressor: UL 497B listed with maximum 30 volt clamping level and maximum response time of 5 nanoseconds.
 - .4 Suppressor: multi-stage Construction and both differential and common mode protection.
- 2.11 AS-BUILT RISER DIAGRAM
- .1 Fire alarm system riser diagram: in glazed frame on black lamicooid sheet with bevelled edges, white lettering and designations, minimum size 600 x 600 mm.
- 3 EXECUTION
- 3.01 MANUFACTURER'S INSTRUCTIONS
- .1 Compliance: comply with manufacturer's written recommendations or Specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.
- 3.02 INSTALLATION
- .1 Install systems in accordance with CAN/ULC-S524 and TB OSH Chapter 3-04.
 - .2 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.
 - .3 Connect alarm circuits to main control panel.
 - .4 Install end-of-line devices at end of alarm and signalling circuits.
- 3.03 FIELD QUALITY CONTROL
- .1 Site Tests:
 - .1 Perform tests in accordance with CAN/ULC-S537.
 - .2 Fire alarm system:

- .1 Test each device and alarm circuit to ensure manual stations, thermal and smoke detectors sprinkler system Halon system transmit alarm to control panel and actuate first stage alarm general alarm 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 circuits for capability of providing alarm signal on each side of single open-circuit fault condition imposed near midmost point of circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
 - .2 Test each conductor on circuits for capability of providing alarm signal during ground-fault condition imposed near midmost 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 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.
 - .2 Test each conductor on circuits for capability of providing alarm signal during ground-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.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.04 TRAINING

- .1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

3.05 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

LEGEND - GENERAL			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ISOLATION VALVE		PIPE UP
	GLOBE VALVE		PIPE DOWN
	BALL VALVE		CAPPED PIPE
	CHECK VALVE		DIRECTION OF FLOW
	VALVED AND CAPPED PROVISION		PIPE SLEEVE
	PLUG VALVE		CONTINUOUS PIPE
	PRESSURE REDUCING VALVE		METER
	FLOW SWITCH		UNION
	FLOW METER, VENTURI		STRAINER
	SOLENOID VALVE		FLEXIBLE PIPE CONNECTION
	CIRCUIT BALANCING VALVE		PUMP
	NEEDLE VALVE		PRESSURE GAUGE WITH COOK
	PRESSURE DIFFERENTIAL VALVE		THERMOMETER
	CONNECT TO EXISTING		FAN SPEED CONTROLLER
	ACCESS PANEL		SLEEVE THROUGH BEAM
	ACCESS DOOR		SLEEVE THROUGH WALL
			DOWN THROUGH FLOOR

LEGEND - PLUMBING & DRAINAGE	
SYMBOL	DESCRIPTION
	SANITARY DRAIN - NEW
	STORM DRAIN
	PUMPED DRAIN
	VENT PIPE
	DRAIN WITH CLEANOUT
	DRAIN WITH CLEANOUT UP TO FLOOR
	DRAIN WITH CLEANOUT UP TO FLOOR
	RUNNING TRAP WITH CLEANOUT
	RUNNING TRAP WITH CLEANOUT
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	DOMESTIC HOT WATER RECIRC
	DOMESTIC TEMPERED WATER
	GAS PIPE
	CONDENSATE DRAIN
	PIPE UP
	PIPE DOWN
	CAPPED PIPE
	DIRECTION OF FLOW
	SHOWER HEAD
	FLOOR DRAIN OR ROOF DRAIN
	RAINWATER LEADER
	GREASE TRAP

LEGEND - HVAC			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	REFRIGERANT LIQUID		SINGLE LINE RIGID DUCT
	REFRIGERANT DISCHARGE		SINGLE LINE DUCT WITH ACOUSTIC LINING
	REFRIGERANT SUCTION		SINGLE LINE FLEXIBLE DUCT
	SUPPLY OR OUTSIDE AIR DUCT		DOUBLE LINE FLEXIBLE DUCT
	RETURN OR EXHAUST DUCT		SUPPLY AIR DIFFUSER
	SUPPLY DUCT DOWN		RETURN AIR GRILLE
	RETURN DUCT DOWN		NUMBER/DIFF NECK SIZE DIFF TYPE/SUPPLY AIR L/S
	ROUND DUCT UP		FIRE DAMPER
	ROUND DUCT DOWN		MOTORIZED DAMPER
	DUCT WITH ACOUSTIC LINING		MANUAL BALANCING DAMPER
	DOUBLE LINE DUCT		BACK DRAFT DAMPER
	SOUND ATTENUATOR		THERMOSTAT
	RETURN AIR		HUMIDISTAT
	RELIEF AIR		DOOR UNDERCUT
	SUPPLY AIR		DOOR GRILLE
			OUTDOOR AIR

MAKE UP AIR UNIT SCHEDULE (GAS FIRED)																			
TAG	SYSTEM	LOCATION	TYPE	MODEL #	GAS		AIRFLOW	MIN O.A.	FAN MOTOR (SUPPLY)		VOLTAGE	MCA (AMPS)	MOCP (AMPS)	WEIGHT		REMARKS			
					INPUT (MBH)	OUTPUT (MBH)			L/S	CFM				%	KW		HP	Pa	In.w.c.
MUA-1	WASH BAY	MEZZANINE #1	CONDENSING - OUTDOOR	DJX10/MM/R	800	728	3,776	8000	100	5.60	7.5	150	0.6	575/3/60	14.1	20	1,406	3,100	NOTES 1,2,&3
MUA-2	WELDING BAY	MEZZANINE #1	CONDENSING - OUTDOOR	DJX40/MM/R	275	250	1,180	2500	100	1.49	2	100	0.4	575/3/60	4.1	15	680	1,500	NOTES 1,2,&3
MUA-3	SERVICE BAY	MEZZANINE #1	CONDENSING - OUTDOOR	DJX140/MM/R	1,100	1001	4,955	10500	100	7.46	10	185	0.75	575/3/60	16.6	25	1,724	3,800	NOTES 1,2,&3

NOTES:
 1. SPECIFICATIONS BASED ON ENGINEERED AIR.
 2. ACCEPTABLE ALTERNATIVES SUBJECT TO SHOP DRAWING REVIEW, BOUSSUET, AND REZOR.
 3. COMPLETE WITH CONDENSATE NEUTRALIZER, MERV 8 FILTERS, VIBRATION ISOLATION, VARIABLE FREQUENCY DRIVE (VFD), DISCONNECT SWITCH, CONVENIENCE OUTLET.

EXHAUST FAN SCHEDULE													
TAG	SYSTEM	LOCATION	TYPE	MODEL	CAPACITY			ESP	VOLTAGE			REMARKS	
					L/S	CFM	Pa		In.w.c.	KW	HP		BHP
EF-1	WASH BAY EXHAUST	ROOF	BELT DRIVE	CUBE-300	3,376	7,154	90	.37	575/3/60	1.12	1.5	1.13	NOTES 1,2,3,&4
EF-2	WELDING BAY EXHAUST	ROOF	BELT DRIVE	CUBE-180	1,156	2,450	90	.37	575/3/60	0.37	.5	0.39	NOTES 1,2,3,&4
EF-4	MECHANICAL TOOL EXHAUST	CORRIDOR PW50	DIRECT	CSP-A700-VG	236	501	90	.37	115/1/60	0.06	.08	0.11	NOTES 1,2,3,&4
EF-5	BATTERY STORAGE EXHAUST	CORRIDOR PW50	DIRECT	CSP-A390-VG	94	200	125	.50	115/1/60	0.03	.04	0.05	NOTES 1,2,3,&4
EF-6	TIRE STORAGE EXHAUST	CORRIDOR PW50	DIRECT	CSP-A700-VG	260	551	90	.37	115/1/60	0.07	.09	0.12	NOTES 1,2,3,&4
EF-7	SERVICE BAY EXHAUST	ROOF	BELT	CUBE-220	2,478	5,251	90	.37	575/3/60	1.12	1.5	1.1	NOTES 1,2,3,&4
EF-8	SERVICE BAY EXHAUST	ROOF	BELT	CUBE-220	2,478	5,251	340	1.37	575/3/60	1.12	1.5	1.1	NOTES 1,2,3,&4
EF-9	SERVICE BAY TAILPIPE EXHAUST	ROOF	DIRECT	USF-12-B6	1,274	2,700	1,495	6.00	575/3/60	3.73	5	3.9	NOTES 1,2,3,&4
EF-9a	SHOP AREA TAILPIPE EXHAUST	ROOF	DIRECT	USF-10-B6	637	1,350	1,495	6.00	575/3/60	3.73	5.0	1.82	NOTES 1,2,3,&4
EF-10	STOCKS/STORES ROOM EXHAUST	ROOF	BELT	CUBE-220	2,478	5,251	90	.37	575/3/60	1.12	1.5	1.1	NOTES 1,2,3,&4
EF-11	SHOP AREA EXHAUST	ROOF	BELT	CUBE-220	2,478	5,251	90	.37	575/3/60	1.12	1.5	1.1	NOTES 1,2,3,&4
EF-13	ELECTRICAL ROOM EXHAUST	ROOF	BELT	CUBE-160	755	1,600	90	.37	115/1/60	0.19	.3	.22	NOTES 1,2,3,&4
EF-16	WASHROOM EXHAUST	WASHROOM PW38	DIRECT	CUE-060-VG	38	81	60	.25	115/1/60	0.04	.1	0.01	NOTES 1,2,3,&4
EF-17	MUDROOM EXHAUST	ROOF	DIRECT	CUE-060-VG	38	80	60	.25	115/1/60	0.19	.3	0.01	NOTES 1,2,3,&4
EF-23	OPERATIONS LOCKER EXHAUST	ROOF	BELT	CUBE-100	415	880	155	.62	115/1/60	0.19	.25	.21	NOTES 1,2,3,&4
EF-24	WASHROOM EXHAUST	ROOF	BELT	CUBE-140	775	1,643	115	.46	575/1/60	0.25	.3	0.33	NOTES 1,2,3,&4
SF-2	MEZZANINE SUPPLY	MECHANICAL ELECTRICAL MEZZANINE EXHAUST	BELT	CUBE-140	661	1,400	90	.37	575/1/60	0.28	0.37	.23	NOTES 1,2,3,&4

NOTES:
 1. SPECIFICATIONS BASED ON GREENHECK. ACCEPTABLE ALTERNATIVES: PENNBARY AND COOK, SUBJECT TO SHOP DRAWING REVIEW.
 2. COMPLETE WITH VIBRATION ISOLATION, VARIABLE SPEED DRIVE (BALANCING), AND DISCONNECT SWITCH.
 3. CONTRACTOR TO FIELD VERIFY EXISTING AIRFLOW CAPACITY, STATIC PRESSURE, POWER SUPPLY PRIOR TO SHOP DRAWING SUBMISSION.
 4. RECONNECT NEW FAN TO EXISTING DUCTWORK, POWER SUPPLY, AND CONTROLS. MODIFY THE EXISTING AS REQUIRED TO SUIT NEW FAN.

SPLIT SYSTEM SCHEDULE													
TAG	LOCATION	INDOOR UNIT					OUTDOOR UNIT					REMARKS	
		MODEL #	NOM AIRFLOW	NOMINAL CAPACITY BTU/H	ELECTRICAL		TAG	MODEL #	ELECTRICAL				
AC-1	OFFICE AREA 1	MSZ-GL09NA	95	201	9000	1	208/1/60	CU-1	MKZ-22CON A2	17.2	1.77	208/1/60	NOTES 1,&2
AC-2	OFFICE AREA 2	MSZ-GL09NA	95	201	9000	1	208/1/60						NOTES 1,&2

NOTES:
 1. SPECIFICATIONS BASED ON MITSUBISHI.
 2. ACCEPTABLE ALTERNATIVES: LG, FUJITSU, AND CARRIER, SUBJECT TO SHOP DRAWING REVIEW.

AIR SOURCE HEAT PUMP ROOF TOP UNITS																									
TAG	SYSTEM	LOCATION	MODEL #	COOLING			HEATING		SUPPLY FAN	RETURN FAN	MIN O.A.		SUPPLY ESP		RETURN ESP		ELECTRICAL		WEIGHT	REMARKS					
				TONS	SENS MBH	LATENT MBH	COP @ 17° F	HEAT PUMP @ 17° F (MBH)			ELECTRIC BACKUP HEAT (MBH)	L/S	CFM	L/S	CFM	L/S	CFM	Pa			In.w.c.	Pa	In.w.c.	VOLTAGE	MCA
RTU-1	AC-1	ROOF	FWDH403/K/O/MM/R	39.25	349	122	2.54	283	180	6,607	14,000	5,324	11,280	1,284	2,720	560	2.25	415	1.66	575/3/60	155.4	175	5,697	12,560	-
RTU-2	AC-2	ROOF	FWDH254/K/O/MM/R	23.75	203	82	2.45	125	103	3,693	7,824	2,801	5,934	1,132	2,398	500	2	185	.75	575/3/60	117.6	125	3,629	8,000	-

NOTES:
 1. SPECIFICATIONS BASED ON ENGINEERED AIR. ALTERNATIVES SUBJECT TO SHOP DRAWING REVIEW.
 2. ROOF TOP UNITS COMPLETE WITH CURB ADAPTER, THREE DISCONNECTS (CONVENIENCE OUTLET, ELECTRIC BACKUP COIL, AND UNIT DISCONNECTS).

PUMP SCHEDULE																	
TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	FLUID	SERVICE DUTY	TYPE	CONTROL	FLOW		HEAD		RPM	ELECTRICAL DATA			REMARKS
									L/S	USGPM	M	ft.		VOLTAGE	KW	HP	
P-1	HW HTG. PUMP	MECH/ELEC MEZZANINE	BELL & GOSSETT	EDOCRC XL 55-45	HYDRONIC HEATING WATER	CONTINUOUS	WET ROTOR CIRCULATOR	AQUASTAT + TIMER	1.6	25	10.7	35	1800	120/1/60	0.56	0.8	NOTES 1&2
P-2	BOILER HEATING PUMP 1	MECH/ELEC MEZZANINE	BELL & GOSSETT	EDOCRC XL 36-45	HYDRONIC HEATING WATER	CONTINUOUS	WET ROTOR CIRCULATOR	AQUASTAT + TIMER	1.1	16.9	3.0	10	1800	120/1/60	0.12	0.2	NOTES 1&2
P-3	BOILER HEATING PUMP 2	MECH/ELEC MEZZANINE	BELL & GOSSETT	EDOCRC XL 36-45	HYDRONIC HEATING WATER	CONTINUOUS	WET ROTOR CIRCULATOR	AQUASTAT + TIMER	1.1	16.9	3.0	10	1800	120/1/60	0.12	0.2	NOTES 1&2

NOTES:
 1. SPECIFICATIONS BASED ON BELL & GOSSETT.
 2. ACCEPTABLE ALTERNATIVES, SUBJECT TO SHOP DRAWING REVIEW, ARMSTRONG AND WILCO.

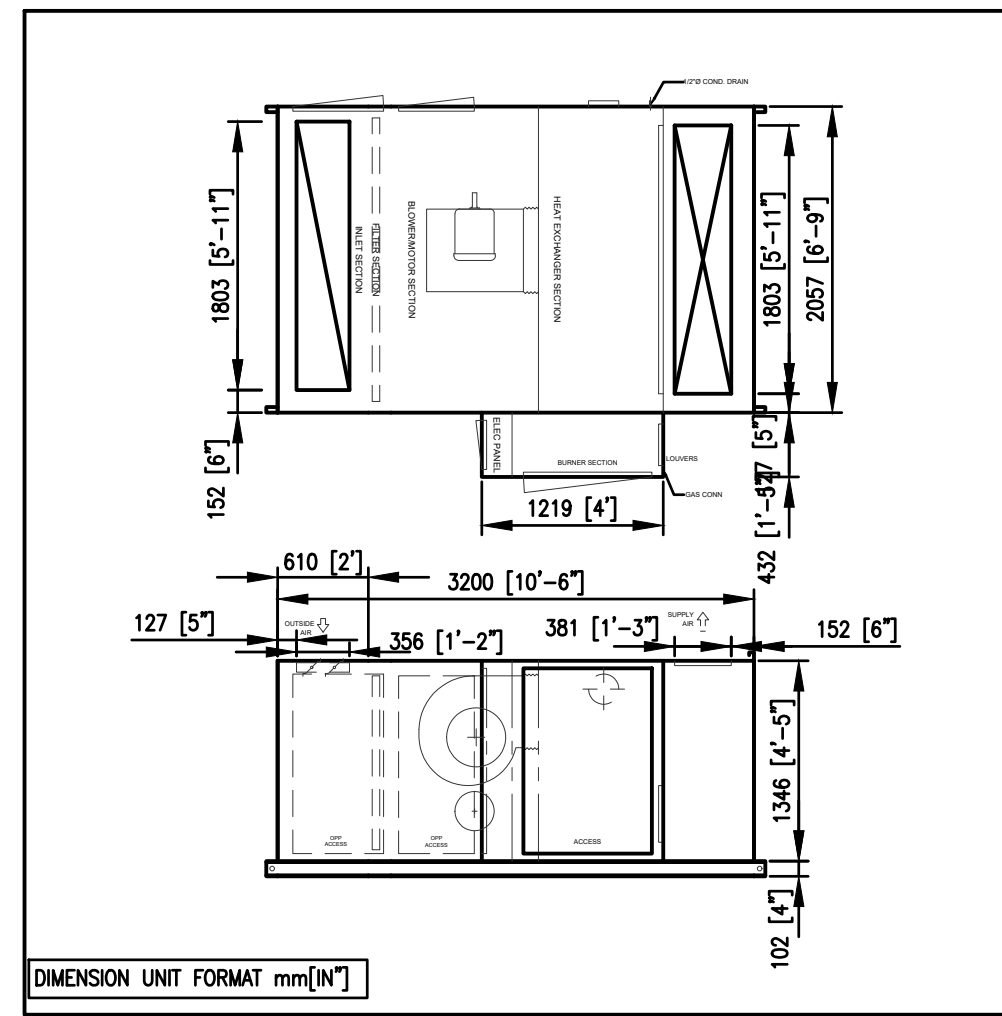
INTAKE HOOD SCHEDULE							
TAG	SYSTEM	LOCATION	THROAT SIZE (EXISTING)	MODEL	AIRFLOW		REMARKS
					L/S	CFM	
HD-1	MUA-1 INTAKE	ROOF ABOVE MEZZANINE #1	1.20m²	WH 50x50x24	3,776	8,000	NOTES 1,2,3&4
HD-2	MUA-2 INTAKE	ROOF ABOVE MEZZANINE #1	0.21m²	WH 32x32x16	1,180	2,500	NOTES 1,2,3&4

NOTES:
 1. SPECIFICATIONS BASED ON GREENHECK.
 2. ACCEPTABLE ALTERNATIVES, SUBJECT TO SHOP DRAWING REVIEW. PENNBARY.
 3. COMPLETE WITH INSECT SCREEN, GRAVITY BACK DRAFT DAMPER(S), AND ADAPTER BASE. STANDARD COLOUR TO BE SELECTED DURING SHOP DRAWING REVIEW.
 4. LOUVER VELOCITY SHALL NOT EXCEED 500 FPM (0.15 LPM)

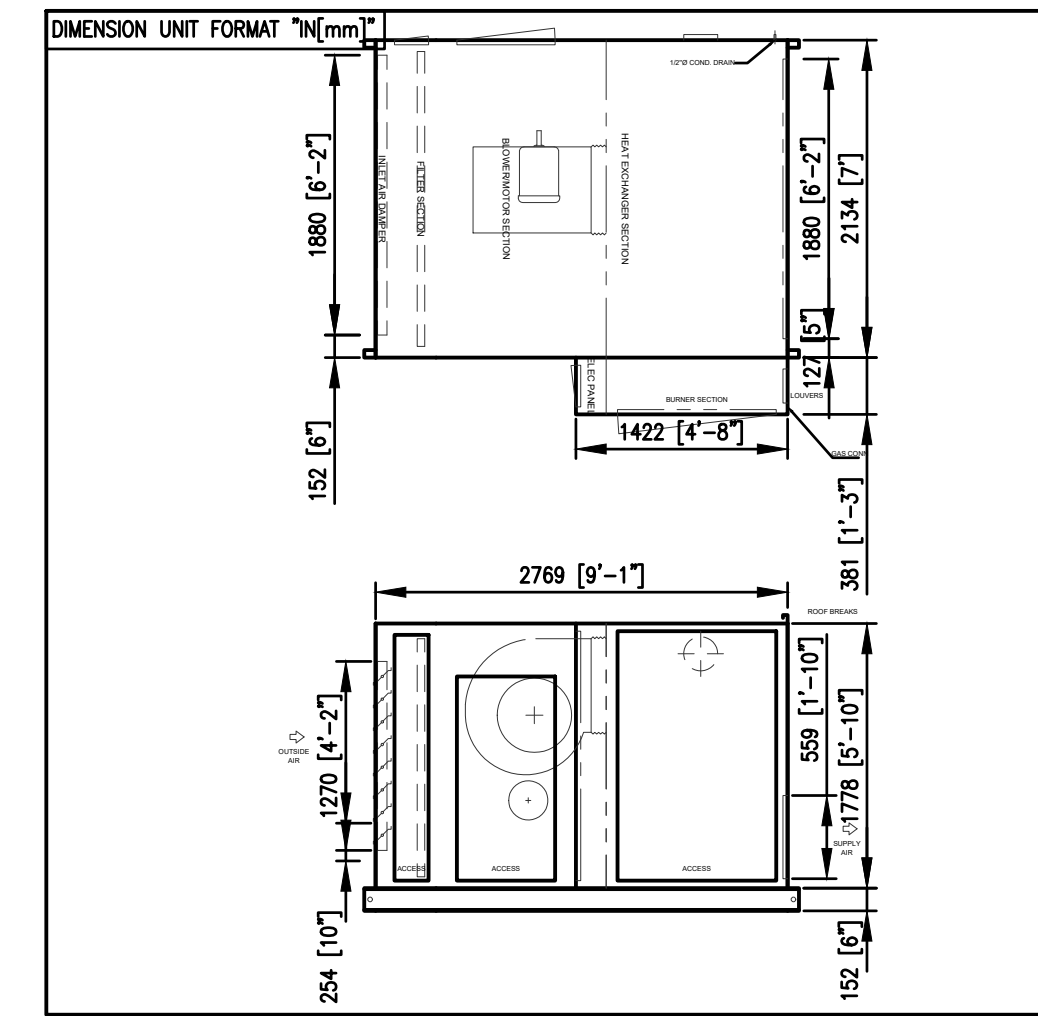
DRAWING SCHEDULE	
DWG NO	DRAWING TITLE
M-100	LEGENDS AND SCHEDULES
M-101	DETAILS
M-102	CONTROLS
M-103	KEY PLAN
M-300	MEZZANINE #1, MEZZANINE #2 AND OFFICE SPACE NEW CONSTRUCTION PART PLANS
M-301	PART ROOF PLAN - NEW CONSTRUCTION

GENERAL NOTES

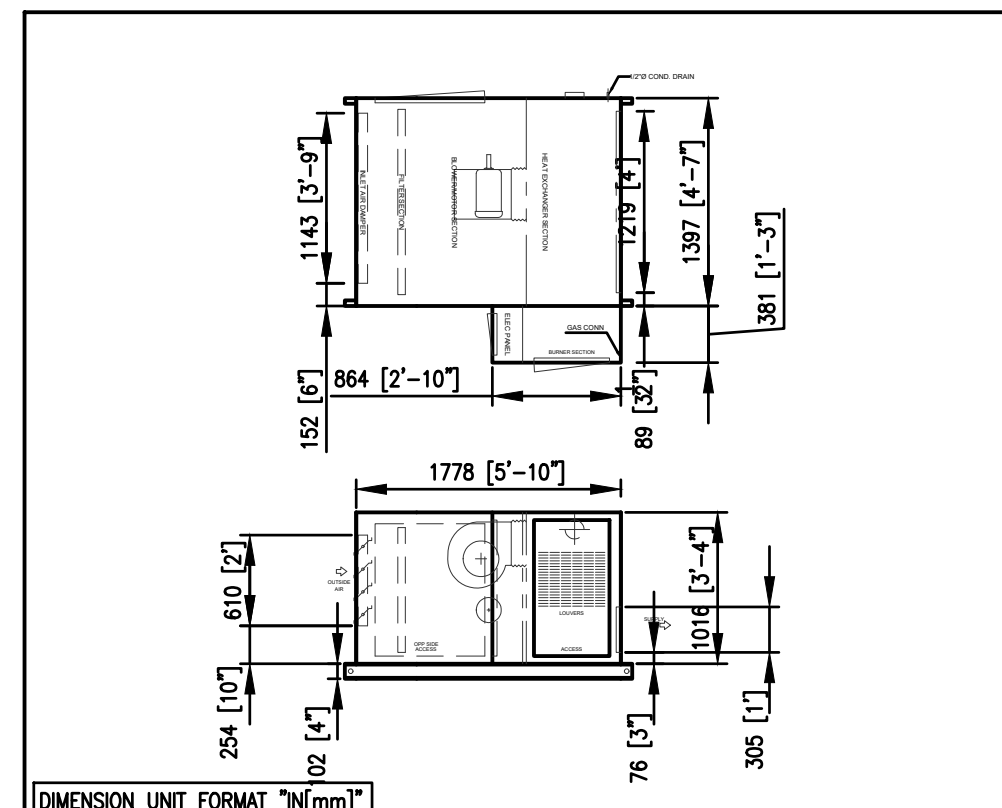
- PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST EDITION OF ALL APPLICABLE CODES, STANDARDS AND BULLETINS, AND TO THE LOCAL AUTHORITIES REQUIREMENTS.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND CHECK THE EXISTING CONSTRUCTION PRIOR TO AND DURING CONSTRUCTION. ANY CHANGES AND/OR DISCREPANCIES SHALL BE REPORTED AND REVIEWED BY THE ENGINEER AND/OR PROJECT MANAGER PRIOR TO PROCEEDING.
- INFORMATION REPRESENTED ON THESE DRAWINGS HAS BEEN TAKEN IN GOOD FAITH FROM THE DRAWINGS INDICATED BELOW AND FROM VISUAL FIELD REVIEWS. ARC ENGINEERING AND ITS REPRESENTATIVES ARE NOT RESPONSIBLE FOR ANY DISCREPANCIES AND/OR ERRORS. - TOTTEN SMS HURICKS DATED JULY 2001
- THE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATIONS AND THE DOCUMENTS PERTAINING TO THE WORK OF OTHER TRADES.
- OBTAIN EXACT DIMENSIONS FROM SITE MEASUREMENTS. DO NOT SCALE THESE DRAWINGS.
- PENETRATIONS OF EITHER THE FIRE OR SMOKE BARRIERS SHALL BE SLEEVED/SEALED AGAINST THE PASSAGE OF FLAME AND/OR SMOKE WITH A SUITABLE NON-COMBUSTIBLE MATERIAL EQUAL TO THE CONSTRUCTION PENETRATED.
- CHECK AND VERIFY THE LOCATIONS OF ALL PIPES, DUCTWORK AND EQUIPMENT WITH THE WORK OF OTHER TRADES TO PREVENT INTERFERENCE. REMOVAL AND RELOCATION OF ANY SUCH WORK INTERFERING WITH THE WORK OF OTHER TRADES IS THE RESPONSIBILITY OF THE MECHANICAL TRADES, UNLESS OTHERWISE APPROVED IN WRITING.
- PROVIDE ACCESS DOORS AS REQUIRED FOR ALL CONCEALED SERVICEABLE COMPONENTS, LOCATED ABOVE, BEHIND OR BELOW INACCESSIBLE CONSTRUCTION.
- EXISTING EQUIPMENT AND ASSOCIATED COMPONENTS SHALL BE REMOVED AND DISPOSED IN AN APPROPRIATE MANNER.
- ALL SYSTEMS ARE SHOWN IN DIAGNOSTIC FORM. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE NEW SYSTEMS ARE CONFIGURED / INSTALLED WITHIN THE EXISTING AVAILABLE SPACE. MODIFY THE NEW SYSTEMS CONFIGURATION AS REQUIRED TO SUIT



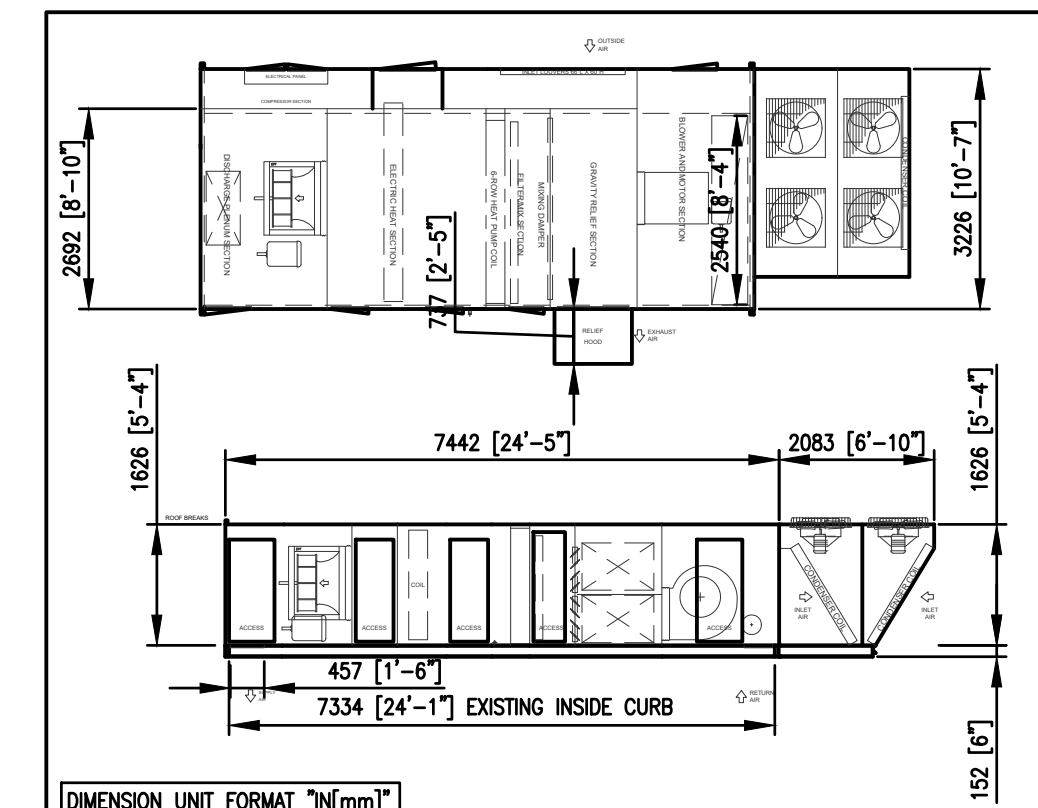
1 MUA-1
M-100 SCALE: NTS



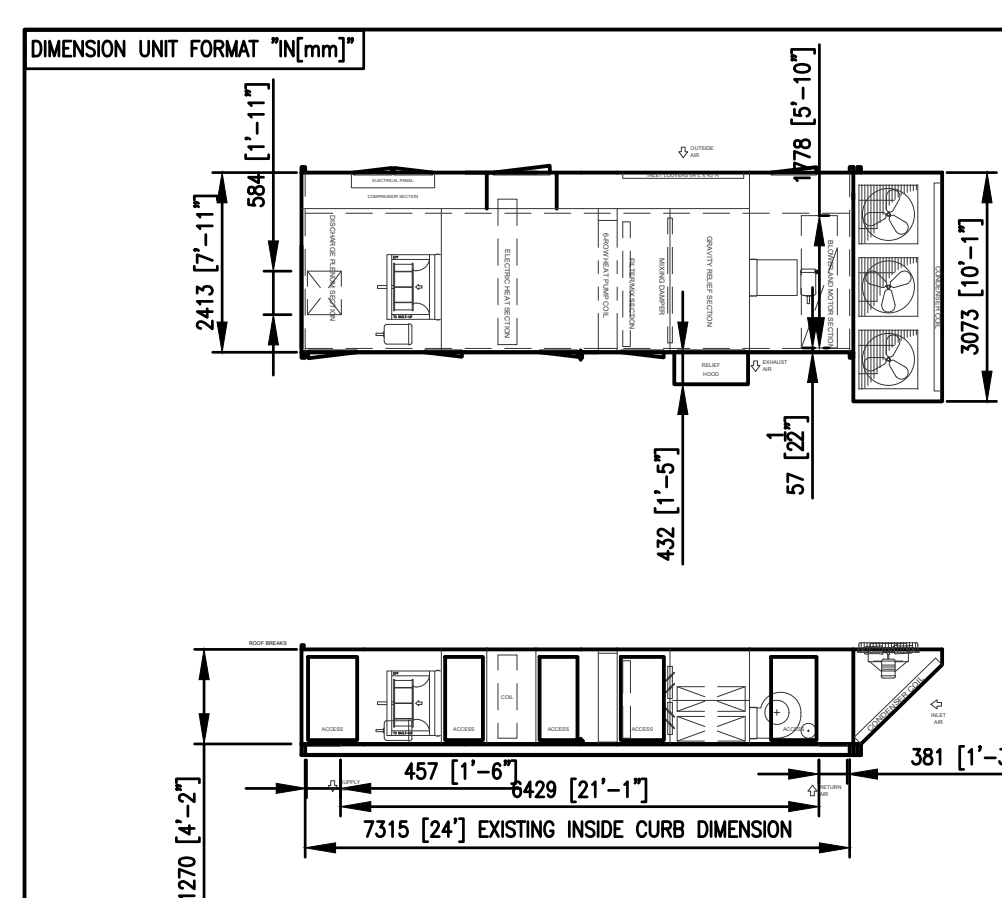
2 MUA-2
M-100 SCALE: NTS



3 MUA-3
M-100 SCALE: NTS

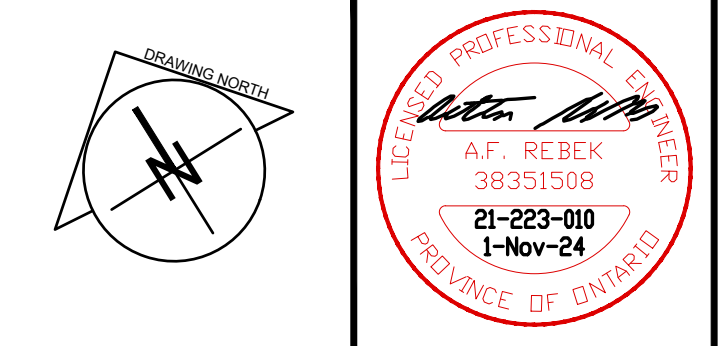


4 RTU-1
M-100 SCALE: NTS



5 RTU-2
M-100 SCALE: NTS

REVISIONS			
No.	DESCRIPTION	DATE	BY
A	ISSUED FOR PERMIT AND TENDER	NOV 01 2024	S.H.



ARC ENGINEERING INC.
 solutions | excellence

1100 South Service Rd., #417
 Stoney Creek ON L8E 0C5
 T • (905) 643-8530
 F • (905) 643-8510

www.arcengineering.ca
 contact@arcengineering.ca

PROJECT:
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT AT WOODLANDS OPERATIONS CNTR.

1179 BRONTE RD.
 OAKVILLE, ON

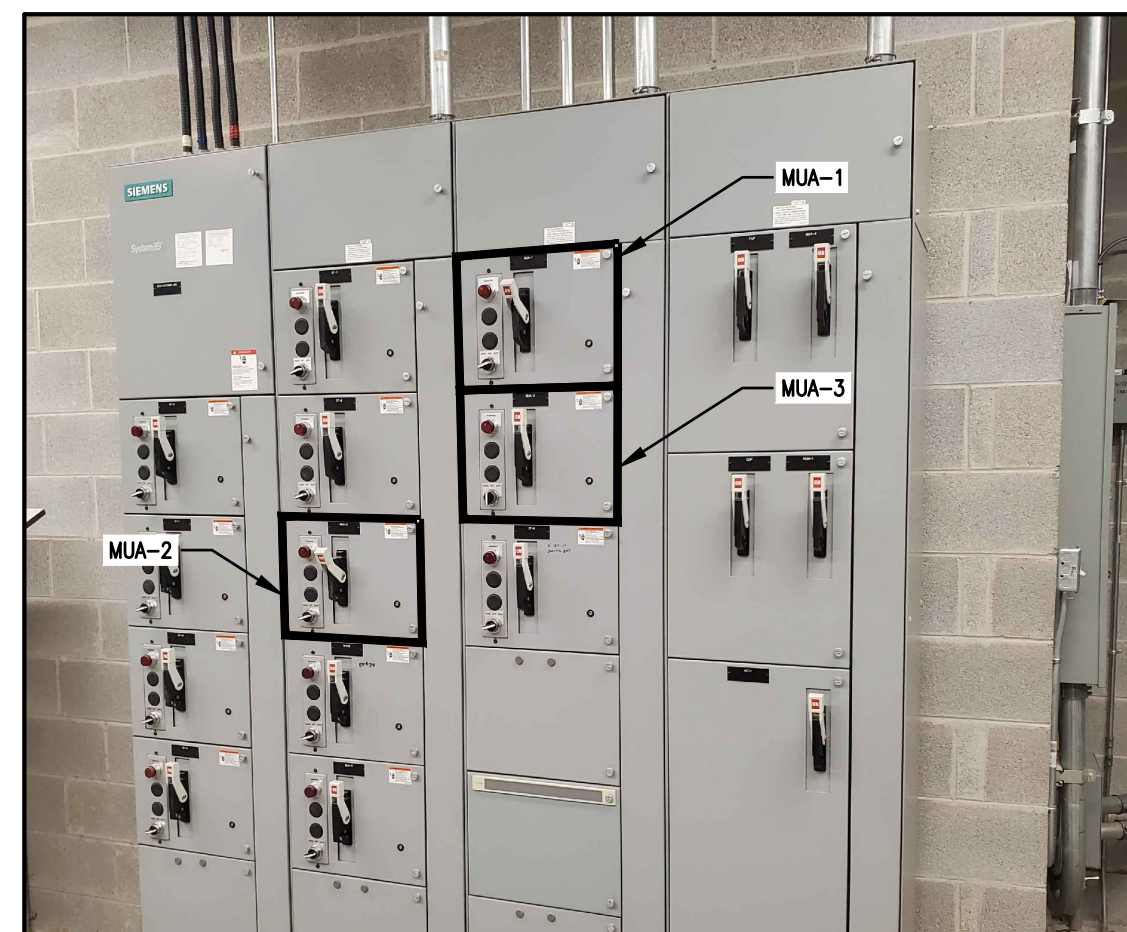
START DATE: 2023-12-10
 DRAWN BY: AON
 DESIGNED BY: S.H.

DRAWING TITLE:
LEGENDS

FIRE ALARM ZONE SCHEDULE				
ZONE	DESCRIPTION	ALARM	TROUBLE	FAN SHUTDOWN
1	FAZ-1 PLUBIC WORKS OFFICE	X		
2	FAZ-2 AMBULANCE SERVICES OFFICE	X		
3	FAZ-3 SHOP AREA	X		
4	FAZ-4 AMBULANCE GARAGE	X		
5	FAZ-5 MAIN TELEPHONE RM.	X		
6	FAZ-6 MEZZANINE #1	X		
7	FAZ-7 WASHBAY	X		
8	FAZ-8 SERVICE BAY	X		
9	FAZ-9 MECH.MEZZ	X		
10	FAZ-10 MUA#1	X	X	X
11	FAZ-11 MUA#2	X	X	X
12	FAZ-12 MUA#3	X	X	X
13	FAZ-13 MUA#4	X	X	X
14	FAZ-14 MUA#5	X	X	X
15	FAZ-15 MUA#6	X	X	X
16	FAZ-16 AC#1	X		
17	FAZ-17 AC#2	X		
18	FAZ-17 AC#3	X		
19	FAZ-19 PUBLIC WORKS FLOW	X		
20	FAZ-20 AMBULANCE SERVICES FLOW	X		
21	FAZ-21 SHOP AREA FLOW	X		
22	FAZ-22 AMBULANCE GARAGE FLOW	X		
23	FAZ-23 STOCK/STORES FLOW	X		
24	FAZ-24 MEZZANINE#1 FLOW	X		
25	FAZ-25 TIRE STORAGE FLOW	X		
26	FAZ-26 SERVICE BAY FLOW	X		
27	FAZ-27 MECH MEZZ FLOW	X		
28	FAZ-28 MEZZANINE#3	X		
29	FAZ-29 SPARE			
30	FAZ-30 SPARE			
31	FAZ-31 SPARE			
32	FAZ-32 SPARE			
33	SZ-1 AMBULANCE GARAGE VALVE		X	
34	SZ-2 SHOP AREA VALVE		X	
35	SZ-3 STOCK/STORES VALVE		X	
36	SZ-4 AMBULANCE SERVICES VALVE		X	
37	SZ-5 PUBLIC WORKS VALVE		X	
38	SZ-6 MEZZANINE#1 VALVE		X	
39	SZ-7 TIRE STORAGE VALVE		X	
40	SZ-8 SERVICE BAY VALVE		X	
41	SZ-9 MECH. MEZZ. VALVE		X	
42	SZ-10 SPRINKLER SYSTEM LOW PSI		X	
43	SZ-11 SPRINKLER SYSTEM MAIN VALVE		X	
44	SZ-12 GENERATOR RUNNING		X	
45	SZ-13 GENERATOR TROUBLE		X	
46	SZ-14 SPARE		X	
47	SZ-15 SPARE		X	
48	SZ-16 SPARE		X	

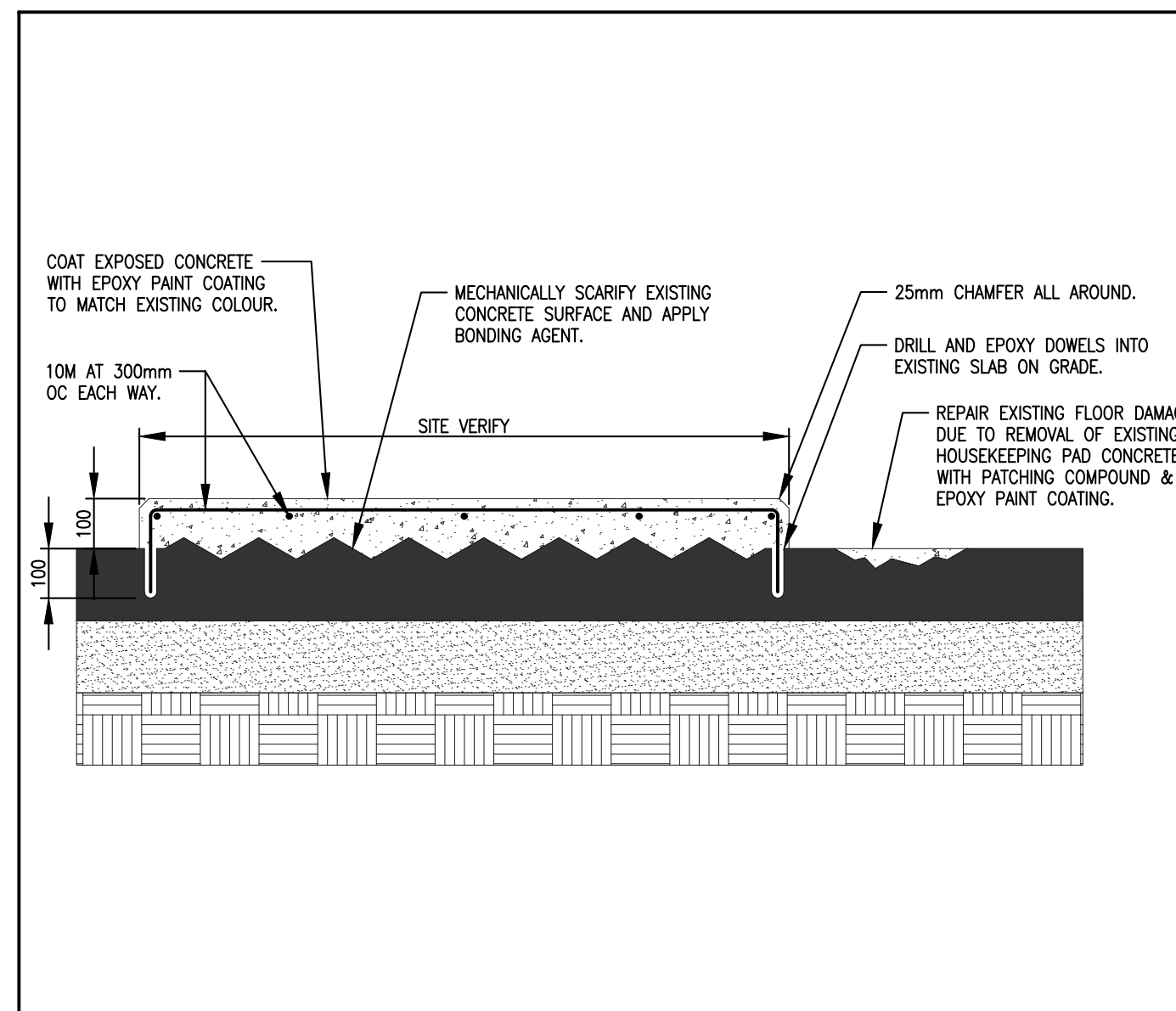
- FIRE ALARM NOTES**
- ALL NEW FIRE ALARM DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH CAN/ULC S524.
 - FIRE ALARM DEVICES SHALL BE REVERIFIED IN ACCORDANCE WITH CAN/ULC S537.
 - FIRE ALARM GRAPHIC SHALL BE UPDATED IN ALL LOCATIONS TO REFLECT THE UPDATED LAYOUT OF THE FIRE ALARM SYSTEM.
 - CONNECT ALL ASSOCIATED ALARM, SUPERVISORY ZONE WIRING, AND SIGNAL CIRCUIT WIRING ETC., TO FIRE ALARM PANEL.
 - ALL WIRING TO BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND TO THE ONTARIO ELECTRICAL SAFETY CODE.
 - DUCT TYPE SMOKE DETECTOR TO SHUTDOWN AIR HANDLER FAN UPON ACTIVATION OF ANY FIRE ALARM SIGNAL.
 - EXISTING FIRE ALARM PANEL IS EDWARDS EST-2. ALL DEVICES TO BE OF EDWARDS BRAND, PROGRAMMING, ETC., AND IS TO BE BY AN EDWARDS CERTIFIED VENDOR.
 - NEW DETECTORS TO BE INSTALLED IN ACCESSIBLE AND VISIBLE LOCATIONS.
 - WHERE DUCT-TYPE DETECTOR CANNOT BE LOCATED IN MAIN STRAIGHT SUPPLY AIR DUCT SECTION, PROVIDE DETECTORS AT EACH SUPPLY AIR BRANCH LOCATION.

1 EXISTING FIRE ALARM ZONE SCHEDULE
M-101

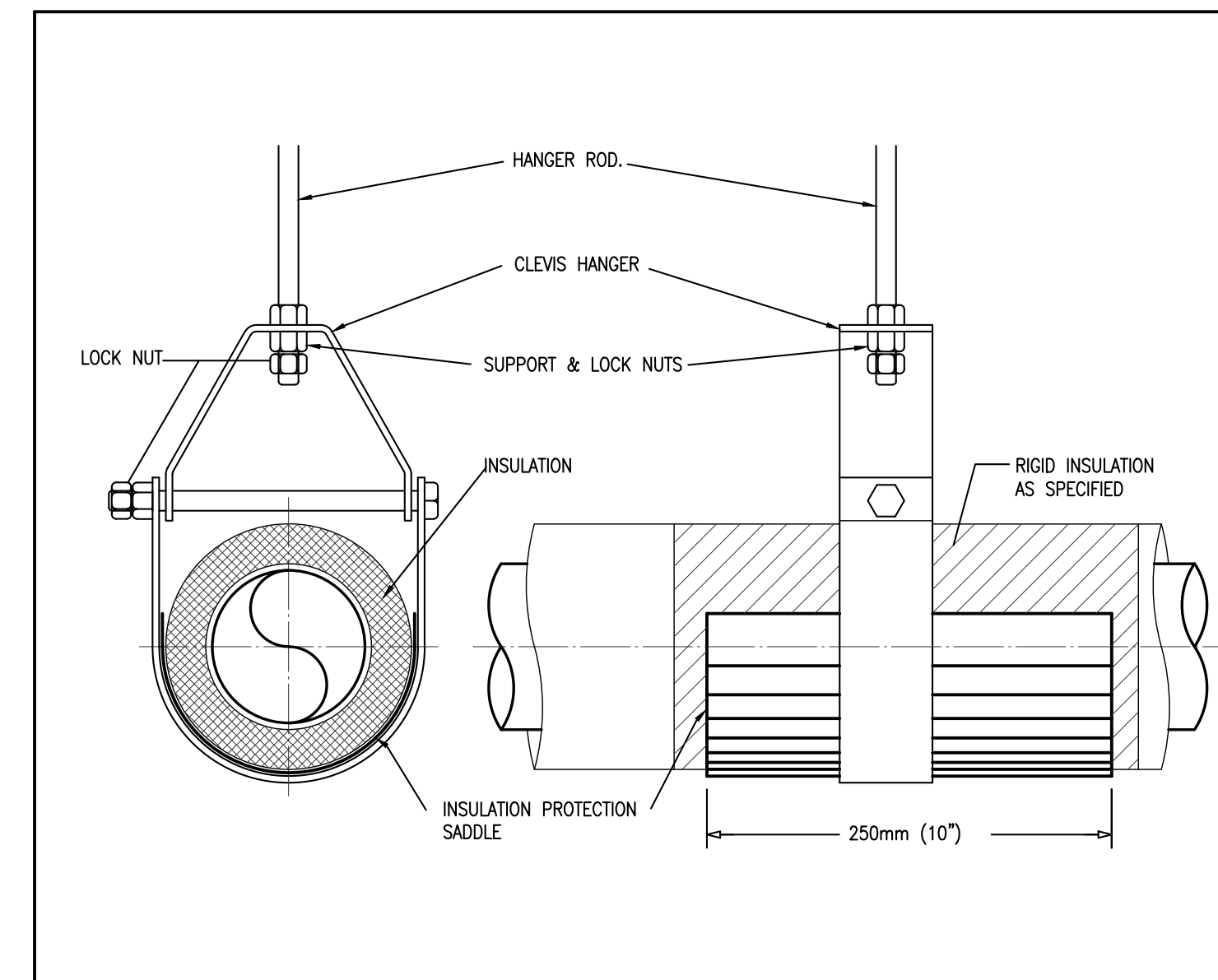


- ELECTRICAL NOTES**
- MAINTAIN THE EXISTING MCC BRANCH CIRCUITS SHOWN FOR RE-USE.
 - REMOVE EXISTING MCC MOTOR STARTER COMPONENTS (H-O-A) FOR EACH MAKE-UP AIR UNITS SHOWN. NEW UNITS COME WITH VFD'S.
 - EXISTING MCC LISTED SWITCHES TO BE RE-USED FOR NEW MAKE-UP AIR UNITS. REPLACE FUSES WITH NEW AS PER MOCP LISTED IN EQUIPMENT SCHEDULE.

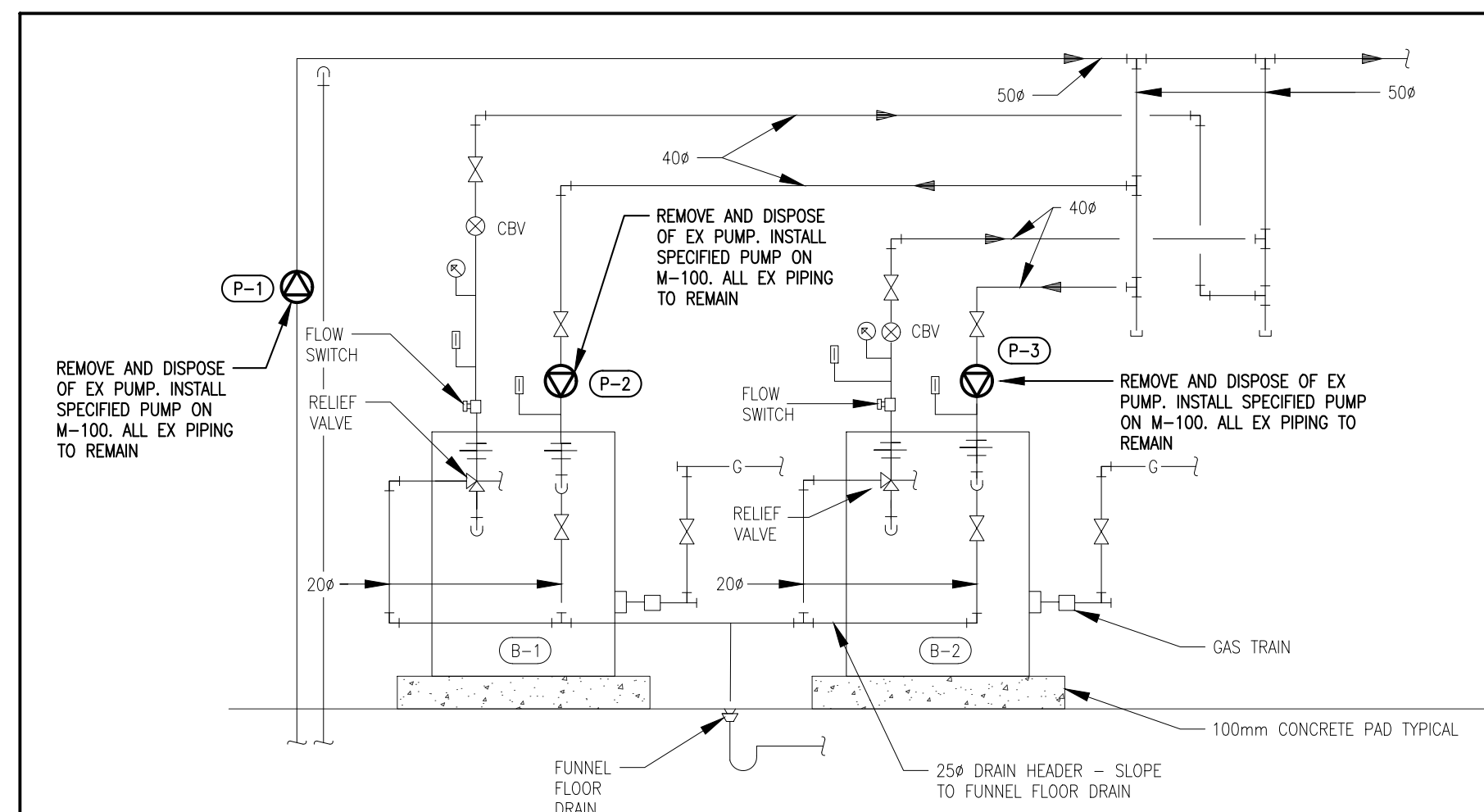
2 EXISTING MCC-1
M-101 SCALE: N.T.S.



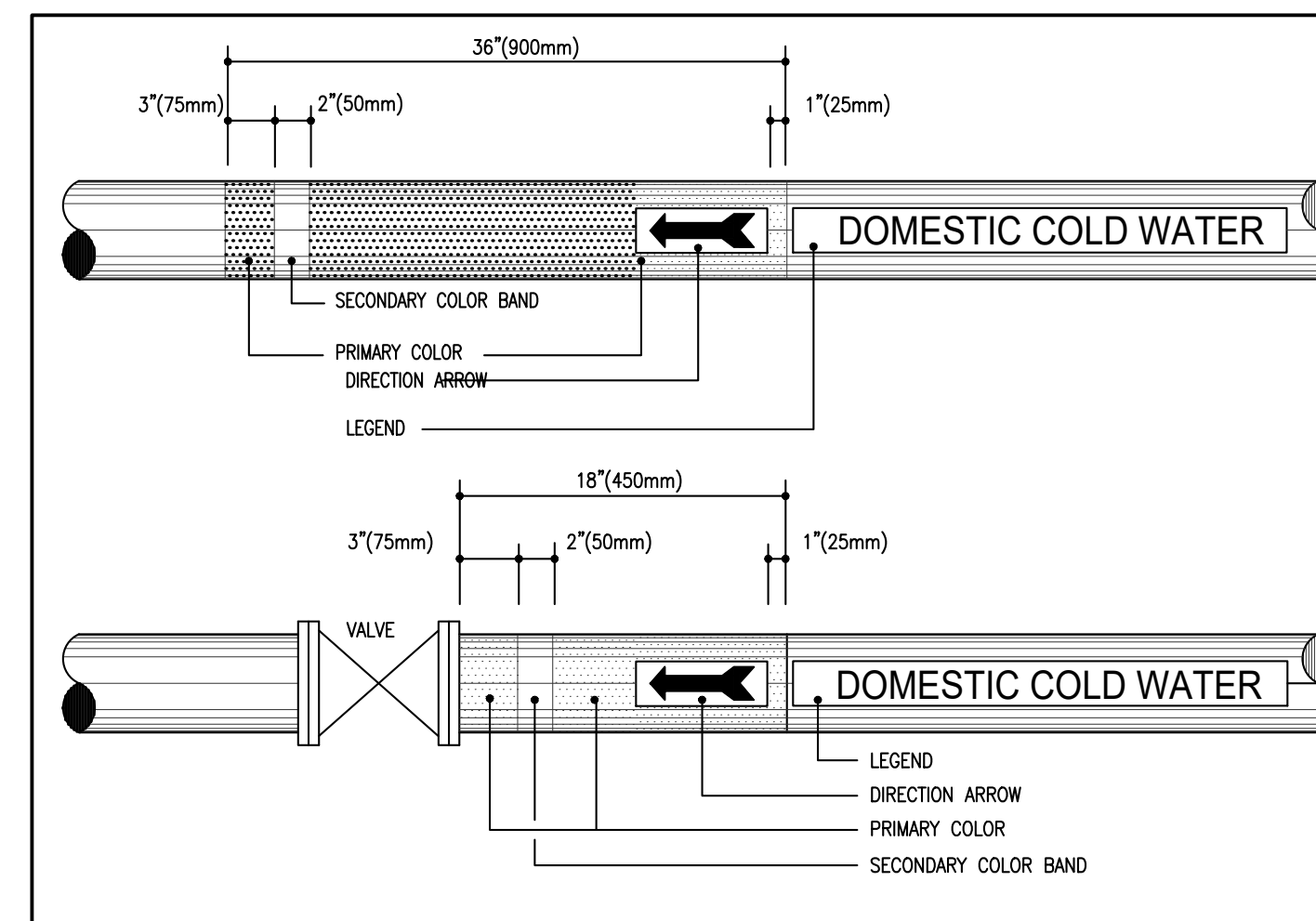
3 HOUSEKEEPING PAD DETAIL
M-101 SCALE: N.T.S.



4 PIPE HANGER
M-101 SCALE: N.T.S.



5 BOILER PUMP ELEVATION NEW CONSTRUCTION
M-101 SCALE: N.T.S.



6 PIPE IDENTIFICATION DETAIL
M-101 SCALE: N.T.S.

GENERAL NOTES

- ELECTRICAL NOTES**
- ARRANGE AND PAY FOR ESA INSPECTION(S).
 - IDENTIFY ALL ELECTRICAL EQUIPMENT. IDENTIFICATION SHALL CONSIST OF ENGRAVED LAMACOID NAMEPLATES ADHERED TO DEVICES BY SELF-TAPPING COUNTER SUNK SCREWS. TAPE TYPE NAMEPLATES WILL NOT BE ACCEPTED.
 - ALL PANELS WITH CIRCUITS ADDED OR REMOVED SHALL HAVE NEW COMPUTER GENERATED PANEL SCHEDULES PLACED IN THEM. THE SCHEDULE SHALL INDICATE THE PANEL DESIGNATION, WHERE THE PANE IS FED FROM, VOLTAGE, PHASE, BRANCH CIRCUIT NUMBERS, BREAKER AMPERAGE, AND CIRCUIT DESCRIPTION.
 - GROUND ALL EQUIPMENT IN ACCORDANCE WITH CODE REQUIREMENTS AND AS INDICATED. GROUNDING CONDUCTORS TO BE COPPER, INSULATED (GREEN); SIZE PER CODE.

No.	DESCRIPTION	DATE	BY
A	ISSUED FOR PERMIT AND TENDER	NOV 01 2024	S.H

REVISIONS

ARC ENGINEERING INC.
solutions | excellence

1100 South Service Rd., #417
Stoney Creek ON L8E 0C5
T • (905) 643-8530
F • (905) 643-8510

www.arcengineering.ca
contact@arcengineering.ca

PROJECT:
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT AT WOODLANDS OPERATIONS CNTR.

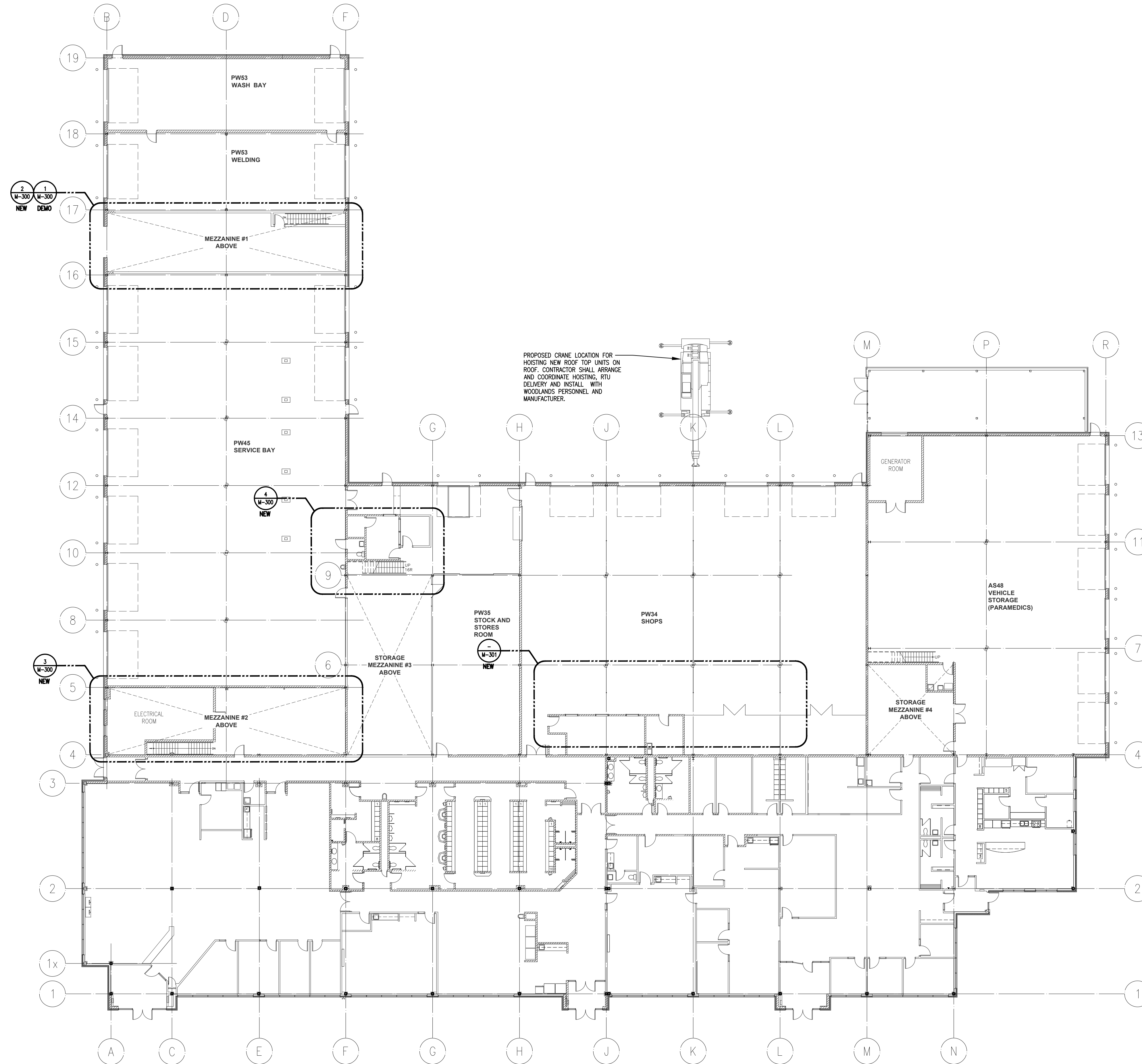
1179 BRONTE RD.
OAKVILLE, ON

START DATE: 2023-12-10	DRAWN BY: A0N	DESIGNED BY: S.H
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DRAWING TITLE:
DETAILS

SCALE: AS NOTED	DRAWING No.:
PROJECT: 21-223-010	M-101

PLOT DATE: November 1, 2024



GENERAL NOTES

No.	DESCRIPTION	DATE	BY
A	ISSUED FOR PERMIT AND TENDER	NOV 01 2024	S.H.

REVISIONS



DRIVING NORTH



LIC. PROFESSIONAL ENGINEER
A.F. REBEK
38351508
21-223-010
1-Nov-24
PROVINCE OF ONTARIO



ARC ENGINEERING INC.
solutions | excellence

1100 South Service Rd., #417
Stoney Creek ON L8E 0C5
T • (905) 643-8530
F • (905) 643-8510
www.arcengineering.ca
contact@arcengineering.ca

PROJECT:
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT AT WOODLANDS OPERATIONS CNTR.
1179 BRONTE RD.
OAKVILLE, ON

START DATE: 2023-12-10	DRAWN BY: A0N	DESIGNED BY: S.H.
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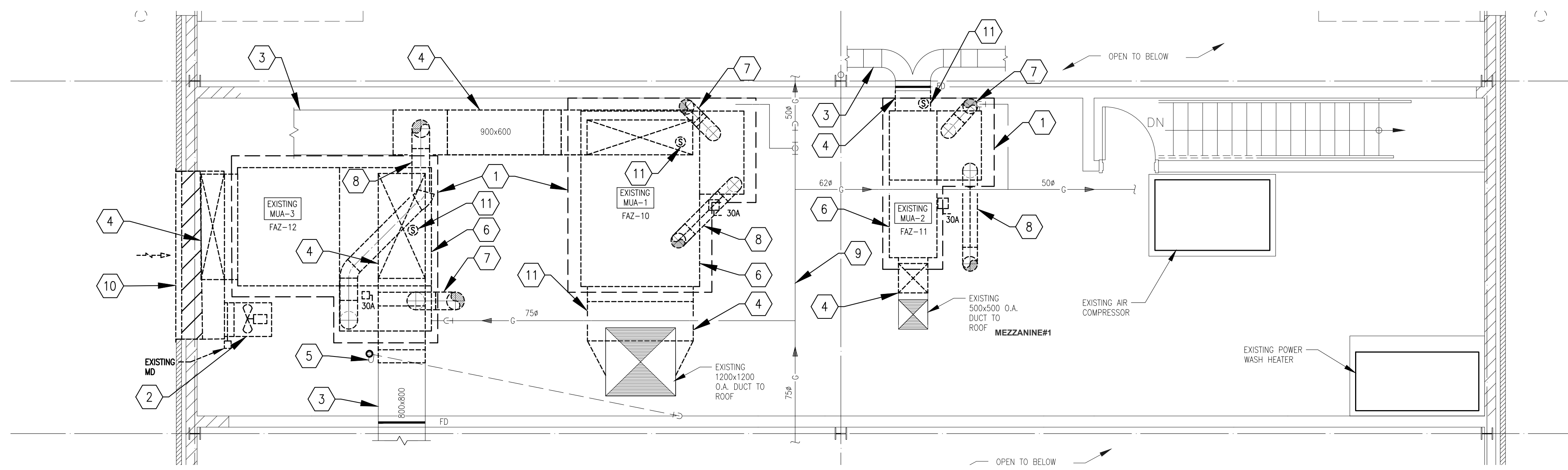
DRAWING TITLE:
KEY PLAN

SCALE: 1:200	DRAWING No.:
PROJECT: 21-223-010	M-103

PLOT DATE: November 1, 2024

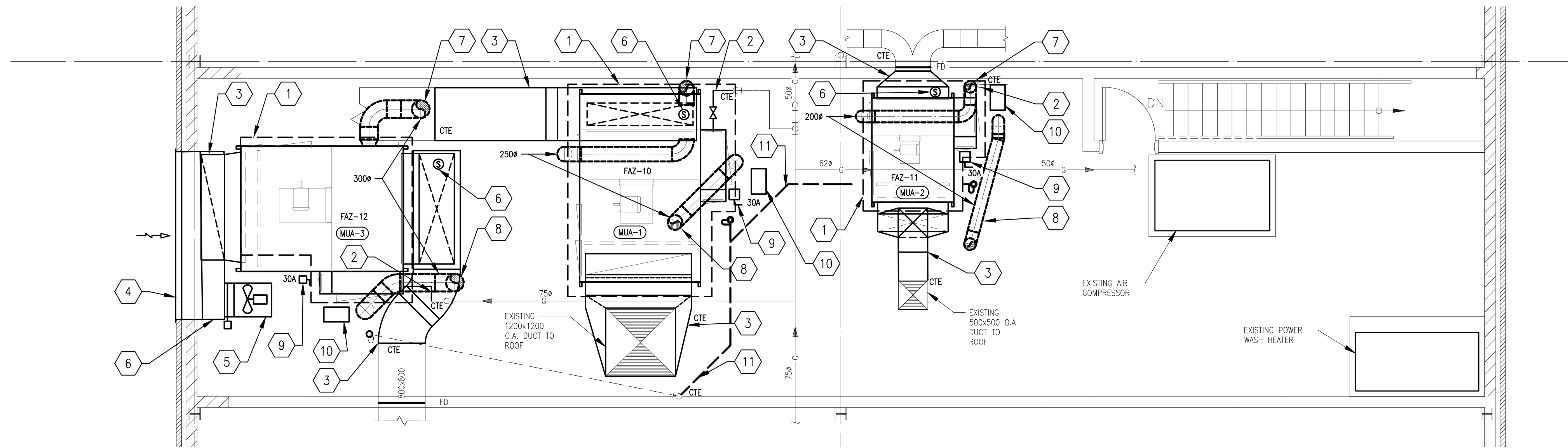
ORIGINAL SHEET SIZE: ARCH D





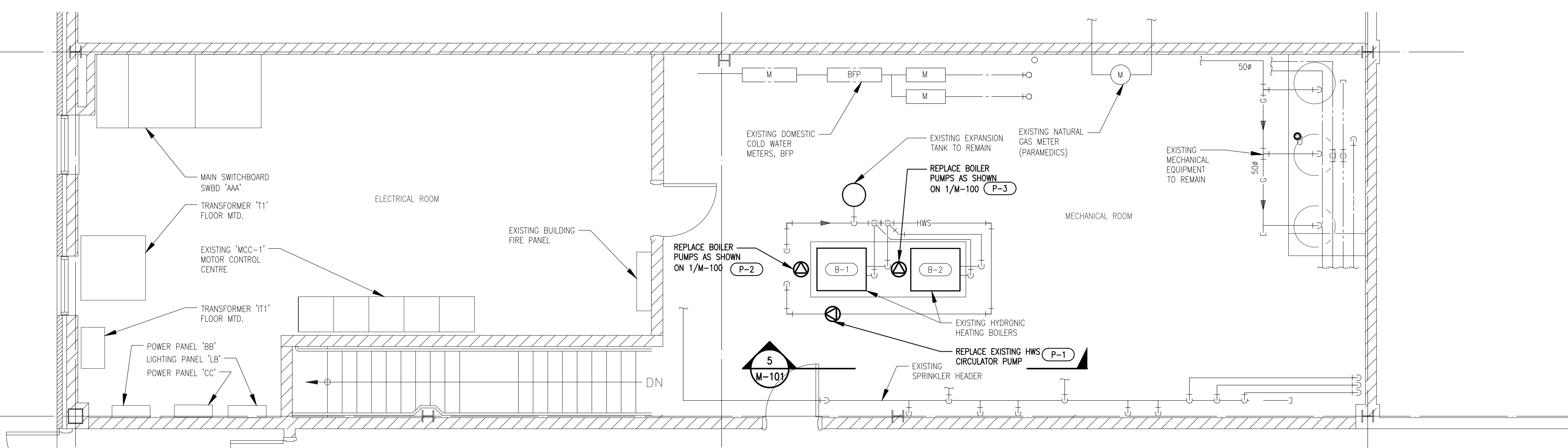
1 MEZZANINE #1 PART PLAN - DEMOLITION
M-300 SCALE: 1:50

- DEMOLITION DRAWING NOTES 1/M-300:**
- REMOVE AND DISPOSE OF THE EXISTING HOUSEKEEPING CURB, GRIND SMOOTH THE EXISTING SUSPENDED SLAB TO SUITE NEW CONCRETE CURB DIMENSIONS.
 - EXISTING PLENUM MOUNTED FAN AND DAMPER TO BE REMOVED SALVAGED, PROTECTED AND REINSTALLED COMPLETE WITH ALL ASSOCIATED COMPONENTS.
 - EXISTING THERMALLY INSULATED SUPPLY AIR DUCT TO REMAIN.
 - EXISTING THERMALLY INSULATED DUCT TO BE DISCONNECTED, REMOVED AND DISPOSED TO THE EXTENT SHOWN ON PLAN. MAKE THE EXISTING TO REMAIN DUCTWORK SUITABLE FOR REUSE.
 - EXISTING 100mm DIAMETER SANITARY FLOOR DRAIN TO REMAIN.
 - EXISTING INDIRECT NATURAL GAS FIRED MAKE-UP AIR UNIT TO BE DISCONNECTED, REMOVED AND DISPOSED COMPLETE WITH ALL ASSOCIATED COMPONENTS. DISCONNECT, REMOVE, AND DISPOSE OF THE EXISTING NATURAL GAS BRANCH BACK TO ISOLATION VALVE, DISCONNECT SWITCH, DUCT SMOKE DETECTOR, FLUE GAS VENTING AND COMBUSTION VENTILATION AIR DUCT AND CONDENSATE PIPING.
 - EXISTING FLUE GAS VENT TO BE DISCONNECTED, REMOVED AND DISPOSED. MAKE GOOD THE EXISTING ROOF PENETRATION SUITABLE FOR REUSE.
 - EXISTING COMBUSTION AIR DUCT TO BE DISCONNECTED, REMOVED, AND DISPOSED. MAKE GOOD THE EXISTING ROOF PENETRATION SUITABLE FOR REUSE.
 - EXISTING 75mm² NATURAL GAS MAIN TO REMAIN.
 - DISCONNECT, REMOVE, SALVAGE AND PROTECT THE OUTDOOR AIR LOUVER AND ASSOCIATED COMPONENTS FOR REINSTALLATION. DISCONNECT, REMOVE AND DISPOSE OF THE INTAKE PLENUM AND EXISTING WALL ASSEMBLY FROM BOTTOM OF LOUVER TO THE MEZZANINE FINISHED FLOOR LEVEL. PROVIDE SHORING, DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO TO SUPPORT THE WALL AS REQUIRED. MAKE GOOD EXISTING BUILDING ELEMENTS AFFECTED BY THE REMOVALS.
 - DISCONNECT, REMOVE AND DISPOSE OF THE EXISTING DUCT MOUNTED SMOKE DETECTOR TEMPORARILY TERMINATE CABLING SUITABLE FOR REUSE.

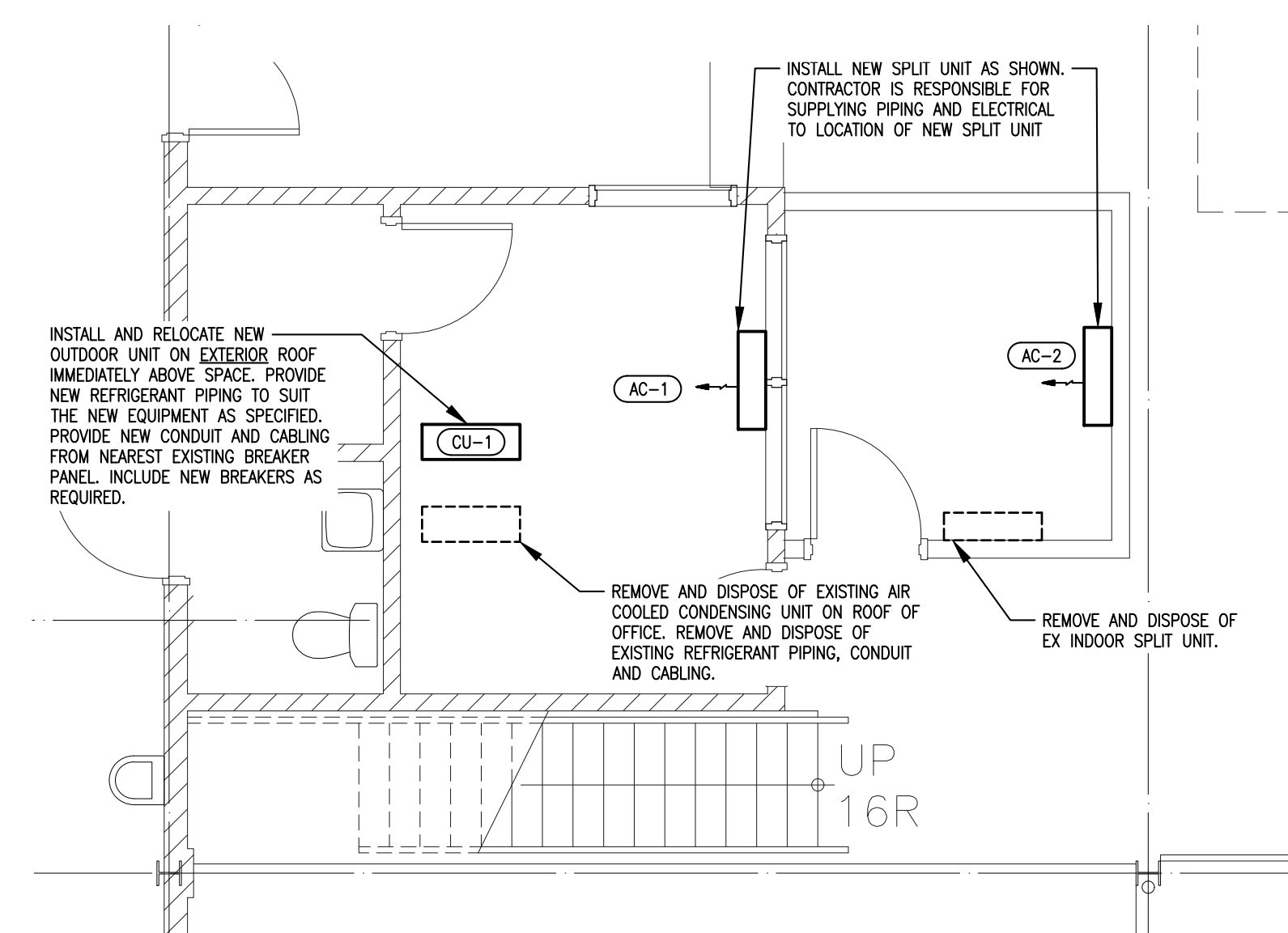


2 MEZZANINE #1 PART PLAN - NEW CONSTRUCTION
M-300 SCALE: 1:50

- NEW CONSTRUCTION DRAWING NOTES 2/M-300:**
- PROVIDE NEW CONCRETE PAD EXTENDING 150mm (6") FROM UNITS EDGE AND 100mm (4") THICK. CONTRACTOR TO COORDINATE LOCATION OF PAD ON SITE.
 - EXTEND AND CONNECT EXISTING GAS LINE TO NEW MUA. INSTALL TO COMPLY WITH MANUFACTURER SPECIFICATIONS AND CSA B149
 - CONTRACTOR TO SUPPLY AND INSTALL NEW DUCTWORK AS REQUIRED TO CONNECT NEW MUA UNIT TO EXISTING DUCT WORK. DUCT WORK AS SPECIFIED.
 - REINSTALL LOUVER AND ASSOCIATED COMPONENTS TO MATCH EXISTING. INFILL THE WALL OPENING TO MATCH THE PRE-EXISTING CONDITIONS INCLUDING MATERIALS AND COLOURS
 - REINSTALL PLENUM MOUNTED EXHAUST FAN AND ASSOCIATED COMPONENTS.
 - INSTALL NEW DUCT MOUNTED SMOKE DETECTOR, CONNECT TO EXISTING WIRING.
 - REUSE EXISTING PENETRATION INSTALL NEW VENT SIZE AS PER DRAWINGS. INSTALL TO COMPLY WITH MANUFACTURERS REQUIREMENTS AS SPECIFIED.
 - REUSE EXISTING PENETRATION FOR NEW COMBUSTION AIR INTAKE. SIZE OF VENT AS SHOWN ON DRAWINGS. INSTALL TO COMPLY WITH MANUFACTURERS REQUIREMENTS AND AS SPECIFIED
 - PROVIDE NEW NON-FUSED DISCONNECT SWITCH. CONTRACTOR TO SUPPLY AND INSTALL CONDUIT AND CABLING REQUIRED FOR INSTALLATION FROM MCC TO UNIT.
 - PROVIDE CONDENSATE NEUTRALIZER FOR AND PIPE TO NEAREST FINISHED FLOOR DRAIN (FFD).
 - PROVIDE NEW 2" HUB DRAIN FOR CONDENSATE NEUTRALIZER. CONTRACTOR TO CUT AND PATCH CONCRETE AS REQUIRED FOR INSTALLATION OF DRAIN.



3 MEZZANINE #2 PART PLAN - NEW CONSTRUCTION
M-300 SCALE: 1:50



4 OFFICE CONDENSING UNIT REPLACEMENT DEMO & NEW
M-300 SCALE: 1:50

GENERAL NOTES

No.	DESCRIPTION	DATE	BY
A	ISSUED FOR PERMIT AND TENDER	NOV 01 2024	S.H

REVISIONS

ARC ENGINEERING INC.
solutions | excellence

1100 South Service Rd., #417
Stoney Creek ON L8E 0C5
T • (905) 643-8530
F • (905) 643-8510

www.arcengineering.ca
contact@arcengineering.ca

PROJECT:
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT AT WOODLANDS OPERATIONS CNTR.

1179 BRONTE RD.
OAKVILLE, ON

START DATE: 2023-12-10	DRAWN BY: A0N	DESIGNED BY: S.H
DRAWING TITLE: MEZZANINE #1, MEZZANINE #2, AND OFFICE NEW CONSTRUCTION PART PLANS		
SCALE: AS NOTED	DRAWING No.: M-300	
PROJECT: 21-223-010		

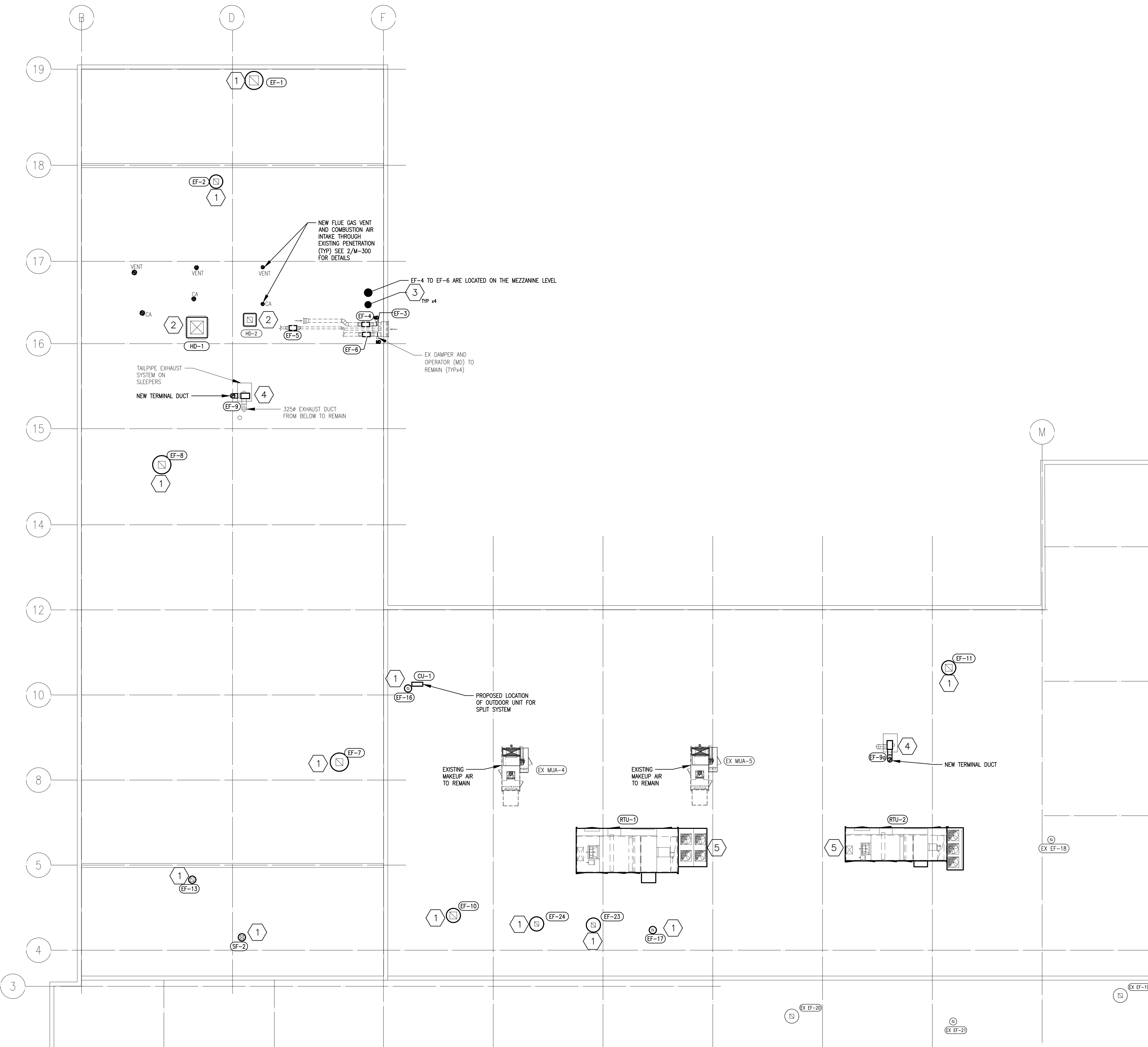
PLOT DATE: November 1, 2024

ORIGINAL SHEET SIZE: ARCH D

GENERAL NOTES

CONSTRUCTION NOTES:

- 1 REMOVE AND DISPOSE OF THE EXISTING EXHAUST FAN. EXISTING FAN CURB TO REMAIN. INSTALL AND RECONNECT NEW EXHAUST FAN AS SCHEDULED COMPLETE WITH ADAPTER BASE AS REQUIRED. MAKE GOOD ALL EXISTING TO REMAIN COMPONENTS AFFECTED BY THE WORK. RECONNECT EXISTING POWER DISTRIBUTION AND CONTROLS.
- 2 REMOVE AND DISPOSE OF EXISTING HOOD INTAKE. INSTALL NEW LOUVERED INTAKE WITH CURB ADAPTER. MAKE GOOD ALL EXISTING TO REMAIN COMPONENTS AFFECTED BY THE WORK. RECONNECT EXISTING POWER DISTRIBUTION AND CONTROLS.
- 3 REMOVE AND DISPOSE OF EXISTING EXHAUST FANS 4,5,6 IN GROUND FLOOR CEILING SPACE. INSTALL NEW EXHAUST FANS ALL EXISTING DUCTWORK TO REMAIN. MAKE GOOD ALL EXISTING TO REMAIN COMPONENTS AFFECTED BY THE WORK.
- 4 REMOVE AND DISPOSE OF EXISTING TAILPIPE EXHAUST FAN. EXISTING DUCTWORK TO REMAIN. INSTALL NEW EXHAUST FAN AS SCHEDULED ON M-100. FIELD VERIFY THE EXISTING DUCT STATIC PRESSURE PRIOR TO SHOP DRAWING SUBMISSION. RECONNECT EXISTING POWER DISTRIBUTION AND CONTROLS.
- 5 REMOVE AND DISPOSE OF EXISTING ROOF TOP UNITS. DISCONNECT EXISTING GAS PIPING AND CAP AT MAIN WITH VALVE. NEW UNIT SHALL BE PLACED ON TOP OF EXISTING ROOF CURB WITH A CURB ADAPTER. REFER TO ELECTRICAL AND STRUCTURAL DRAWINGS.



No.	DESCRIPTION	DATE	BY
A	ISSUED FOR PERMIT AND TENDER	NOV 01 2024	S.H.

REVISIONS

DRAWING NORTH

LIC. PROFESSIONAL ENGINEER
A.F. REBEK
38351508
21-223-010
1-Nov-24
PROVINCE OF ONTARIO

ARC ENGINEERING INC.
solutions | excellence

1100 South Service Rd., #417
Stoney Creek ON L8E 0C5
T • (905) 643-8530
F • (905) 643-8510

www.arcengineering.ca
contact@arcengineering.ca

PROJECT:
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT AT WOODLANDS OPERATIONS CNTR.
1179 BRONTE RD.
OAKVILLE, ON

START DATE: 2023-12-10	DRAWN BY: A0N	DESIGNED BY: S.H.
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DRAWING TITLE:
PART ROOF PLAN - NEW CONSTRUCTION

SCALE: 1:150	DRAWING No.:
PROJECT: 21-223-010	M-301

PLOT DATE: November 1, 2024

ORIGINAL SHEET SIZE: ARCH D

WIRING DEVICES	
	SPECIAL RECEPTACLE. REFER TO NOTES OR DESCRIPTION FOR TYPE
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP SIMPLEX UNO.
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP DUPLEX UNO.
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP DUPLEX CONTROLLED BY OCCUPANCY SENSOR (AUTO ON/OFF)
	2x 125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP DUPLEX UNO.
	125/250 VOLT, 3-POLE, 4-WIRE, STRAIGHT BLADE RECEPTACLE, AMPERAGE AS NOTED
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP DUPLEX UNO ON EMERGENCY OR UPS POWER
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE HALF-SWITCHED RECEPTACLE. 15 AMP DUPLEX CONTROLLED VIA LOCAL SWITCH
	VERTICAL LINE THROUGH ANY RECEPTACLE SYMBOL INDICATES A NON-STANDARD MOUNTING HEIGHT THAT MUST BE FIELD DETERMINED.
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP DUPLEX FOR SYSTEMS FURNITURE
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP DUPLEX FOR SYSTEMS FURNITURE CONTROLLED BY OCCUPANCY SENSOR (AUTO ON/OFF)
	125 VOLT, 2-POLE, 3-WIRE, STRAIGHT BLADE RECEPTACLE. 15 AMP DUPLEX FOR SYSTEMS FURNITURE ON EMERGENCY OR UPS POWER
	RECEPTACLES MOUNTED IN 2 CHANNEL RACEWAY
	TYPICAL RECEPTACLE NOTES. CIRCUITING: B-PANELBOARD I.D., 1-BRANCH CIRCUIT. SUBSCRIPT: XX-CURRENT RATING (IF NOTED).

POWER LAYOUT	
	DISCONNECT SWITCH (DS)
	COMBINATION STARTER (CS)
	MAGNETIC STARTER (MG)
	MANUAL STARTER (MS)
	POWER PANEL - EXISTING
	POWER PANEL - NEW
	POWER TRANSFORMER
	ELECTRIC HEATING EQUIPMENT
	EQUIPMENT SUPPLIED BY OTHERS REQUIRING ELECTRICAL POWER CONNECTION REFER TO EQUIPMENT SCHEDULE
	EQUIPMENT SUPPLIED BY OWNER REQUIRING ELECTRICAL POWER CONNECTION REFER TO OWNER EQUIPMENT SCHEDULE
	MECHANICAL EQUIPMENT/MOTOR REQUIRING ELECTRICAL POWER
	ALL MODES OF OPERATION OF EQUIPMENT SO NOTED TO BE SHUT DOWN BY THE ALARM CONDITION OF THE FIRE ALARM CONTROL PANEL.
	PUSH BUTTON
	PUSH BUTTON STATION
	THERMOSTAT
	TIME CLOCK
	JIFFY POLE
	120V HARDWIRE CONNECTION
	208V, 1# HARDWIRE CONNECTION
	208V, 3# HARDWIRE CONNECTION
	600V, 3# HARDWIRE CONNECTION
	JUNCTION BOX
	HAND DRYER
	FLOOR BOX

LEGEND	
THIS LEGEND REPRESENTS THE SYMBOLS COMMONLY USED. NOT ALL SYMBOLS MAY APPEAR ON THE DRAWINGS. SHOULD A SYMBOL BE FOUND ON THE DRAWING AND NOT APPEARING ON THE LEGEND, THE CONTRACTOR SHALL SUBMIT A QUESTION TO HAVE THE SYMBOL CLARIFIED IN AN ADDENDUM PRIOR TO SUBMITTING A BID.	
ABBREVIATIONS	
20A	DENOTES 5-20R DEVICE
AC	ABOVE COUNTER
ADO	AUTOMATIC DOOR OPENER
AE	APPROVED EQUAL
AFB	ABOVE FINISHED FLOOR
AN	FIRE ALARM ANNUNCIATOR
BED	RECEPTACLE DEDICATED FOR PATIENT BED
BH	BASEBOARD HEATER
CB	CIRCUIT BREAKER
ER	EXISTING TO BE RELOCATED
EX	EXISTING TO REMAIN
FH	FORCED-AIR HEATER
GFI	EQUIPMENT SO NOTED TO BE SUPPLIED WITH A GROUND FAULT CIRCUIT INTERRUPTER
HSKP	HOUSEKEEPING
JB	JUNCTION BOX
PD	POWER DOOR
R	RELAY WITH AUXILIARY CONTACTS
REL	RELOCATED ITEM IN NEW LOCATION
REM	EXISTING TO BE REMOVED IN ITS ENTIRETY
T	TRANSFORMER
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
W	WALL MOUNT - VERIFY HEIGHT
WP	EQUIPMENT SO NOTED TO BE SUPPLIED WITH THE MANUFACTURER'S WEATHER-PROOFING OPTION(S)
①	KEYNOTE - SEE KEYNOTE No. 3 ON DRAWINGS
③	KEYNOTE - SEE KEYNOTE No. 3 ON DRAWINGS

DEMOLITION NOTES	
1.	THE CONTRACTOR SHALL ARRANGE TO TOUR THE FACILITY WITH MAINTENANCE STAFF PRIOR TO SUBMITTING A BID ON THE PROJECT.
2.	DURING THE CONTRACTORS SITE TOUR THEY SHALL BECOME FAMILIAR WITH THE EXISTING BUILDING CONSTRUCTION AND THE LOCATIONS OF THE EXISTING COMMUNICATION CLOSETS, LOCAL POWER PANELS, FIRE ALARM AND OTHER SYSTEMS BEING WORKED ON AS PART OF THIS CONTRACT.
3.	THE CONTRACTOR AND MAINTENANCE STAFF SHALL OPEN EXISTING PANELS AND SYSTEMS TO BECOME FAMILIAR WITH THE EXISTING SYSTEMS AND TO DETERMINE THE FULL SCOPE OF WORK REQUIRED TO CARRY OUT THE PROJECT. THE CONTRACTOR SHALL PROVIDE NEW BREAKERS, DATA/VOICE COMPONENTS, FIRE ALARM DEVICES, LIGHTING SYSTEM COMPONENTS, ETC TO FACILITATE A COMPLETE AND FUNCTIONING SYSTEM AT PROJECT COMPLETION.
4.	THE CONTRACTOR SHALL MEASURE OFF ANY DISTANCES NOT INDICATED FOR HOME RUNNING NEW SERVICES (POWER, FIRE ALARM, SECURITY ETC) AND INCLUDE MATERIALS AND LABOUR REQUIRED IN THEIR BID PRICE.
5.	COORDINATE ALL DEMOLITION WITH GENERAL CONTRACTOR. EVERY EFFORT HAS BEEN MADE TO OUTLINE THE DEMOLITION SCOPE OF WORK. HOWEVER THE DEMOLITION DRAWINGS REPRESENT ONLY THE GENERAL LOCATION AND NUMBER OF FITTINGS, FIXTURES, DEVICES, EQUIPMENT ETC. TO ASSIST IN EVALUATING THE DEMOLITION SCOPE OF WORK. DRAWINGS ARE BASED ON PREVIOUS AS-BUILTS OR FIELD EVALUATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE DURING THE TENDER PERIOD TO DETERMINE THE EXACT SCOPE OF DEMOLITION WORK, QUANTITIES AND THOROUGHLY UNDERSTAND THE SITE CONDITIONS FOR CARRYING OUT THE SAME. REQUESTS FOR EXTRAS DUE TO FAILURE TO PROPERLY EVALUATE THE CONDITIONS THAT AFFECT DEMOLITION SCOPE OF WORK WILL NOT BE CONSIDERED.
6.	SHOULD THE CONTRACTOR ENCOUNTER ANY ASBESTOS DURING THE WORK, THEY SHALL STOP WORK AND NOTIFY THE OWNER IMMEDIATELY.
7.	THE CONTRACTOR SHALL PATCH, REPAIR AND RESTORE FIRE-SEPARATIONS AS REQUIRED FOR INSTALLATION OF ELECTRICAL RACEWAYS AND OUTLETS IN WALLS AND EXTERIOR WALLS.
8.	THE CONTRACTOR SHALL SUBMIT QUESTIONS IN WRITING 5 DAYS PRIOR TO TENDER CLOSING TO ALLOW FOR QUESTIONS TO BE FORMALLY ANSWERED IN AN ADDENDUM.
9.	UNLESS EXISTING CIRCUITS NUMBERS ARE INDICATED ON THE DEMOLITION PLANS, ALL CIRCUITS SHOWN ON THE NEW LAYOUTS ARE NEW CIRCUITS. EXCEPTIONS TO THIS INCLUDE CIRCUITS SHOWN ON THE DEMOLITION PLAN AND AGAIN ON THE NEW LAYOUT. THE CIRCUIT SHOWN BOTH TIMES IS EXISTING AND LOCALIZED IN THE AREA OF WORK. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING FOR ALL NEW CIRCUITS: NEW CONDUIT, WIRING, BREAKERS, SUPPORTS, BACKBOXES, FACEPLATES, RECEPTACLES, ETC FOR A COMPLETE SYSTEM.
10.	EXISTING CIRCUITS BEING REUSED WILL BE INDICATED BY A CIRCUIT NUMBER (IE 2A15) OR A GENERIC NUMBER (IE CCT7). CCT 7 INDICATES THAT THE LIGHTING OR DEVICE IS TO BE CONNECTED TO 1 OF 7 EXISTING CIRCUITS IN THE AREA THAT HAS BECOME FREE AFTER DEMOLITION. THE CONTRACTOR SHALL BALANCE LOADS AND SHUFFLE BREAKERS AFTER THE PANEL LOADS HAVE BEEN CONNECTED TO EQUALLY LOAD EACH PHASE.
11.	WHERE EXISTING LIGHTING CIRCUITS HAVE BEEN REUSED, CONTRACTOR SHALL VERIFY EXISTING VOLTAGE OF CIRCUITS PRIOR TO SUBMITTING ANY SHOP DRAWINGS OR ORDERING OF FIXTURES, SENSORS, CONTROLS, ETC. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES IN FIXTURE VOLTAGE AND EXISTING CIRCUIT VOLTAGE.

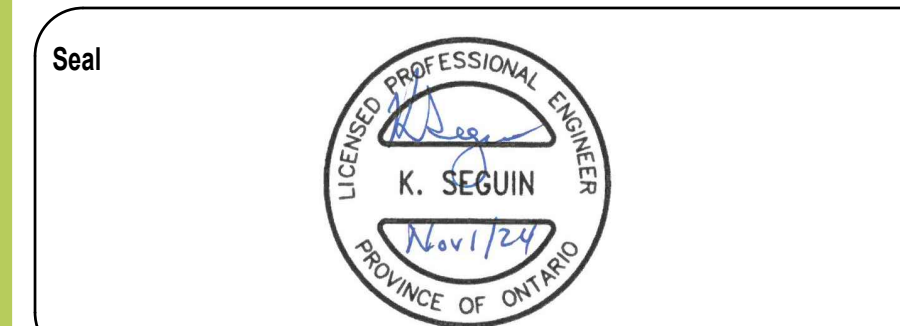
GENERAL NOTES	
1.	THE ELECTRICAL DRAWINGS REPRESENT A PORTION OF THE CONTRACT. THE CONTRACTOR IS TO FAMILIARIZE THEMSELVES WITH ALL OF THE DRAWINGS IN THE PACKAGE AS SOME WORK MAY BE SHOWN ON OTHER DRAWINGS IN THE PACKAGE. CONTRACTOR IS TO DETERMINE FULL EXTENT OF PROJECT PRIOR TO SUBMITTING BID.
2.	THE DRAWINGS ARE NOT TO BE SCALED FOR INSTALLATION PURPOSES. ALL MEASUREMENTS ARE TO BE OBTAINED FROM ARCHITECTURAL PLANS, ELEVATIONS, SHOP DRAWINGS OR BE OBTAINED FROM FIELD MEASUREMENTS.
3.	CONTRACTOR IS TO REMOVE ALL EXISTING DEAD AND ABANDONED CONDUIT AND WIRING BACK TO SOURCE. WHERE NOT POSSIBLE TO REMOVE EXISTING CONDUIT CONDUIT IS TO BE LEFT BEHIND AND EXISTING WIRE IS TO BE REMOVED AND REPLACED WITH A PULL ROPE.
4.	CONTRACTOR IS TO PROVIDE ELECTRONIC CAD AS-BUILT DRAWINGS IN DWG AND PDF FORMAT AT THE COMPLETION OF THE PROJECT. CAD FILES ARE TO BE AUTOCAD 2010.
5.	UNLESS NOTED OTHERWISE ALL WIRING SHALL BE IN CONDUIT AND CONCEALED IN WALLS AND CEILING SPACES. BX IS PERMITTED IN SPECIAL CIRCUMSTANCES AND SHORT DROPS FROM JUNCTION BOXES TO LIGHT FIXTURES. REFER TO SPECIFICATIONS. CONDUIT RUNS ARE TO BE PARALLEL TO WALL STUDS AND DROP FROM JUNCTION BOXES MOUNTED IN THE CEILING SPACE. HORIZONTAL RUNS IN WALLS WILL ONLY BE ACCEPTED UNDER SPECIAL CIRCUMSTANCES (IE OFFSET TO AVOID STRUCTURAL ABOVE) WITH WRITTEN APPROVAL FROM THE OWNER/CONSULTANT.
6.	ALL DATA/COMM WIRING FROM EACH OUTLET IS TO BE PROVIDED IN MIN. #1 (25mm) CONDUITS FROM OUTLET TO THE SOURCE (BACK AND/OR BIX BLOCK). CONTRACTOR CAN GROUP CABLES AND INSTALL A LARGER RUN BACK TO THE SOURCE. WHERE CABLE IS PERMITTED TO RUN FREE-AIR, A CONDUIT SHALL BE INSTALLED FROM THE OUTLET INTO AN ACCESSIBLE CEILING SPACE. PROVIDE BUSHINGS AT TOP OF WALL AND TRANSITION TO J-HOOKS (WITHIN ROOM) OR CABLE TRAY (AT CORRIDOR). CABLE IS NOT PERMITTED TO BE LAYING ON CEILING. COMM WIRING SHALL BE IN CONDUIT FOR ALL EXPOSED AREAS. FREE AIR COMM WIRING TRANSITIONING FROM ACCESSIBLE CEILINGS TO EXPOSED CEILINGS SHALL BE IN CONDUIT THROUGHOUT THE EXPOSED AREA. PROVIDE 12" (300mm) STUBS INTO THE EXPOSED AREAS WITH BUSHINGS. CONDUIT SHALL NOT EXCEED 40% FILL.
7.	UNLESS SPECIFICALLY NOTED AS "CABLING BY OTHERS" THE CONTRACTOR SHALL INCLUDE FOR ALL CABLES TO DEVICES, OUTLETS, ETC AS SHOWN FOR A COMPLETE AND FUNCTIONING SYSTEM(S).
8.	CONTRACTOR IS TO MAINTAIN POWER AND COMMUNICATION CIRCUITS IN AREAS OUTSIDE OF THE CONSTRUCTION AREA. PROVIDE TEMPORARY CONNECTIONS AS REQUIRED. COORDINATE WITH OWNER.
9.	EQUIPMENT BEING REMOVED AND NOT BEING REUSED REMAIN THE PROPERTY OF THE OWNER AND IS TO BE STORED ON SITE. ANY EQUIPMENT THE OWNER DEEMS NO INTEREST IN IS TO BE DISPOSED OF IN A LAWFUL AND SAFE MANNER BY THIS TRADE.
10.	CONTRACTOR IS TO REFER TO ARCHITECTURAL PLANS AND CEILING LAYOUTS TO VERIFY THAT NO INTERFERENCES EXIST PRIOR TO THE INSTALLATION OF FIXTURES AND DEVICES IN WALLS AND CEILINGS.

DRAWING LIST	
E000	GENERAL NOTES, LEGENDS, DRAWING LIST & SCHEDULES
E100	KEY PLAN
E101	ROOF PLAN
E200	DETAILS

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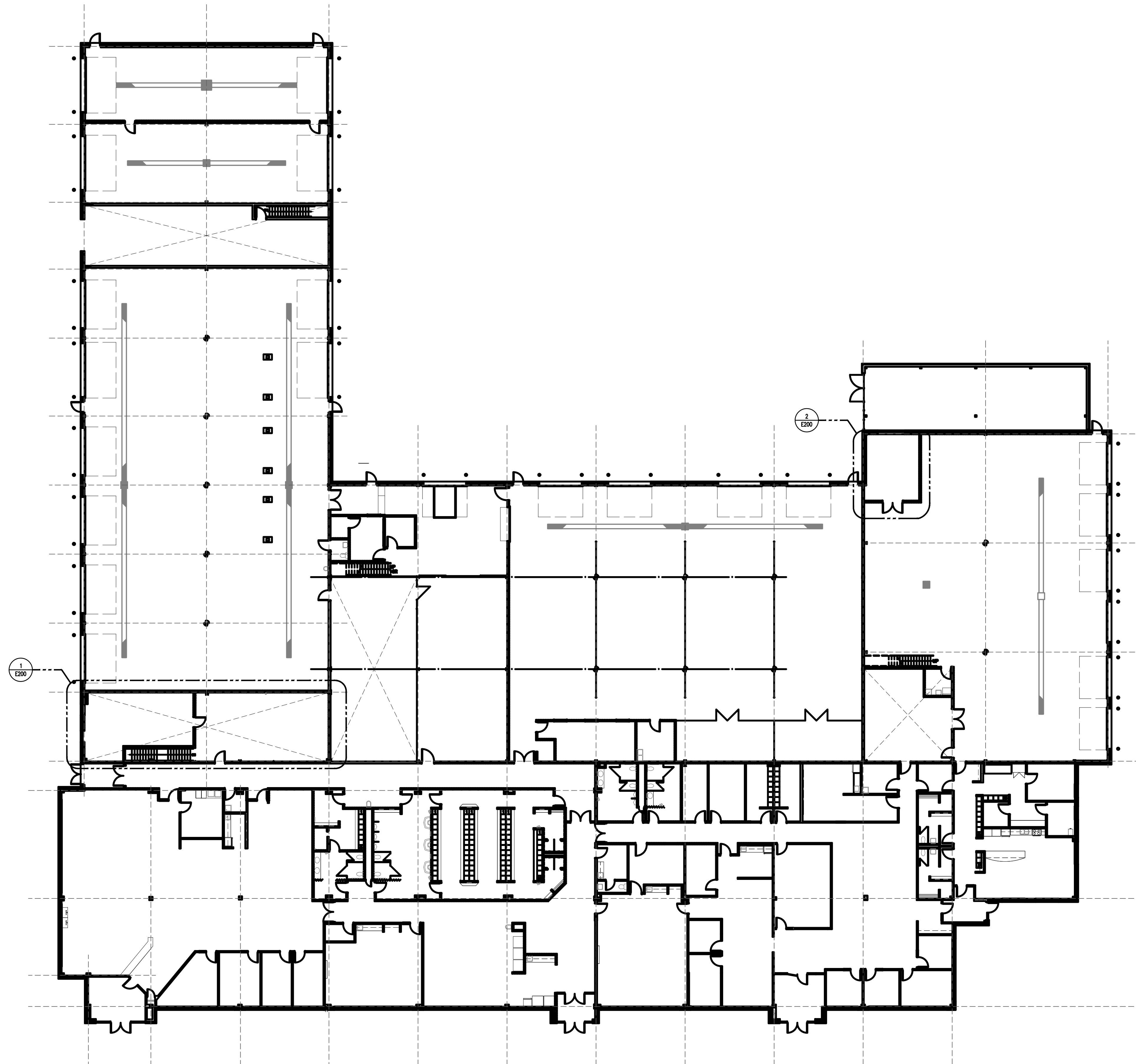
No.	Revision	Date	By
1	ISSUED FOR PERMIT	2024.11.01	SJ
0	ISSUED FOR COORDINATION	2024.08.09	SJ



Project
WOODLANDS OPERATION CENTRE
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT
1179 BRONTE RD, OAKVILLE, ON

Title
GENERAL NOTES, LEGENDS, DRAWING LIST, & SCHEDULES

Drawn By: KM	Designed By: SJ	Approved By: KS	Date: AUGUST 2024
Project No. 24-114	Scale NTS		
Drawing No. E000	Sheet 1 of 4	Revision 1	



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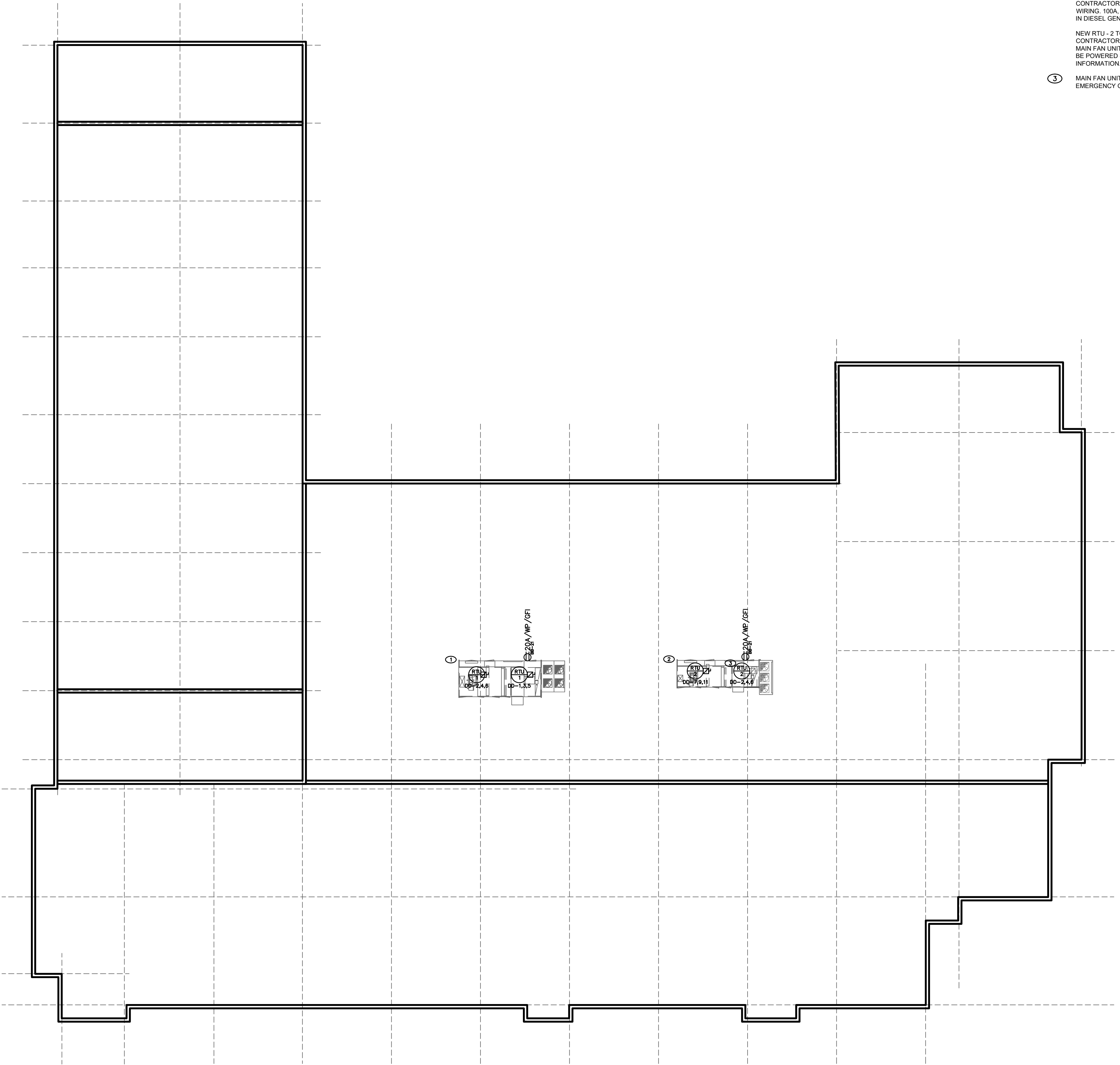
No.	Revision	Date	By
1	ISSUED FOR PERMIT	2024.11.01	SJ
0	ISSUED FOR COORDINATION	2024.08.09	SJ



Project
WOODLANDS OPERATION CENTRE
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT
 1179 BRONTE RD, OAKVILLE, ON

Title
KEY PLAN

Drawn By: KM	Designed By: SJ	Approved By: KS	Date: AUGUST 2024
Project No. 24-114	Scale 1:200		
Drawing No. E100	Sheet 2 of 4	Revision 1	



- ① EXISTING AC - 1 TO BE REMOVED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO COORDINATE TO COMPLETELY REMOVE POWER AND CONTROLS WIRING. 175A MCC BUCKET ASSEMBLY, IN MECHANICAL PENTHOUSE MCC #1, TO BE DISCONNECTED AND MARKED AS SPARE.
- NEW RTU - 1 TO BE INSTALLED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO COORDINATE AND CONNECT NEW POWER AND CONTROLS WIRING. MAIN FAN UNIT, SUPPLEMENTAL HEATING AND MAINTENANCE RECEPTACLE ARE TO BE POWERED SEPARATELY. REFER TO MECHANICAL DRAWING M-100 FOR UNIT INFORMATION.
- ② EXISTING AC-2 TO BE REMOVED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO COORDINATE TO COMPLETELY REMOVE POWER AND CONTROLS WIRING. 100A, 3-POLE BREAKER IN EMERGENCY GENERATOR PANEL P-EDD, LOCATED IN DIESEL GENERATOR ROOM TO BE REMOVED.
- NEW RTU - 2 TO BE INSTALLED MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO COORDINATE AND CONNECT NEW POWER AND CONTROLS WIRING. MAIN FAN UNIT, SUPPLEMENTAL HEATING AND MAINTENANCE RECEPTACLE ARE TO BE POWERED SEPARATELY. REFER TO MECHANICAL DRAWING M-100 FOR UNIT INFORMATION.
- ③ MAIN FAN UNIT FOR NEW RTU - 2 TO BE FED FROM NEW 70A, 3-POLE BREAKER IN EMERGENCY GENERATOR PANEL P-EDD.

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No.	Revision	Date	By
1	ISSUED FOR PERMIT	2024.11.01	SJ
0	ISSUED FOR COORDINATION	2024.08.09	SJ

SEI
Electrical Engineering
 12 Argyle Street N., Caledonia, ON, N3W 1B6
 www.sei-ee.com

Seal

Project
WOODLANDS OPERATION CENTRE
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT
 1179 BRONTE RD, OAKVILLE, ON

Title
ROOF PLAN

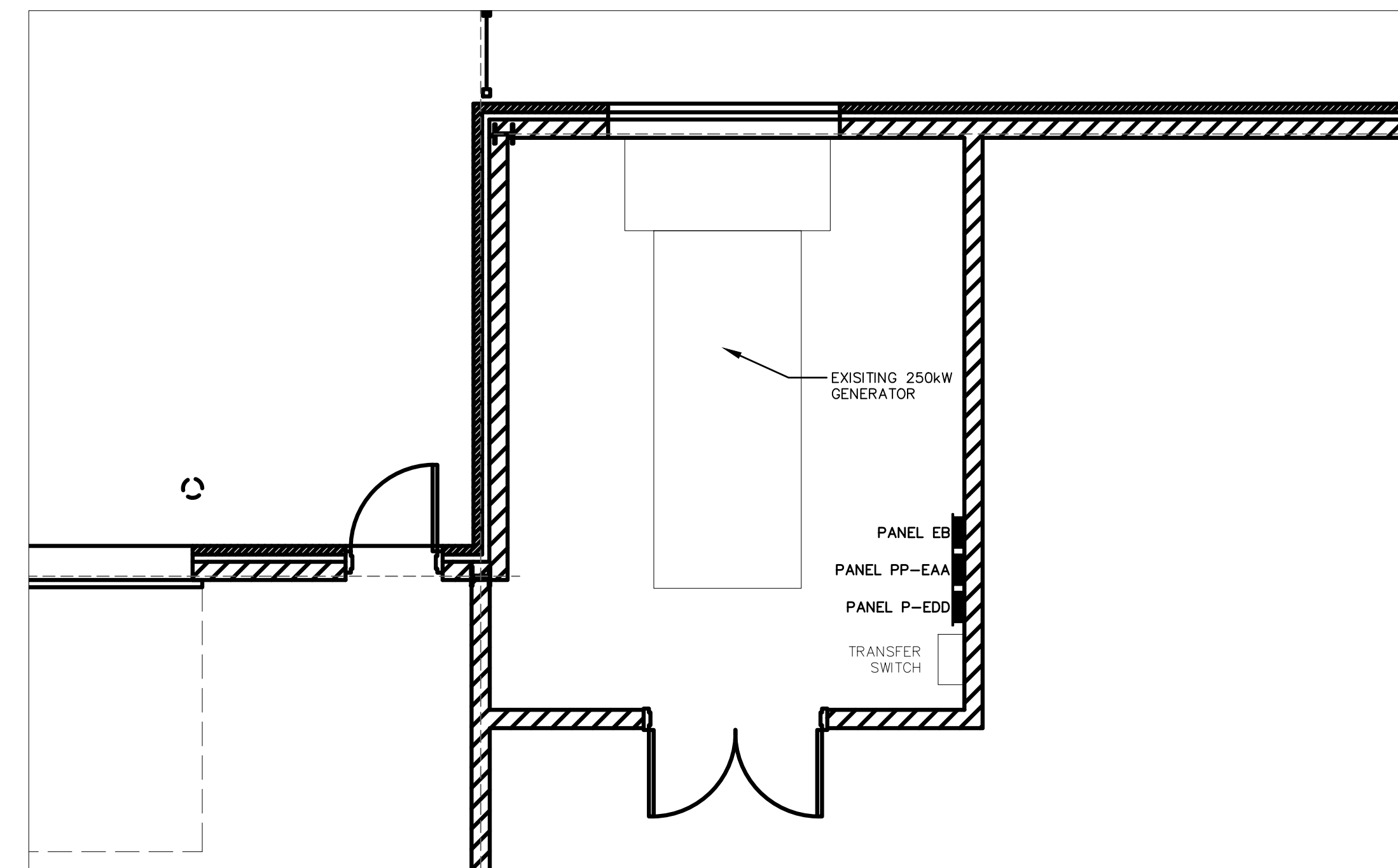
Drawn By: KM	Designed By: SJ	Approved By: KS	Date: AUGUST 2024
Project No. 24-114	Scale 1:200		
Drawing No. E101	Sheet 3 of 4	Revision 1	

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 October 31, 2024 - 04:46pm Plotted by: Kyle

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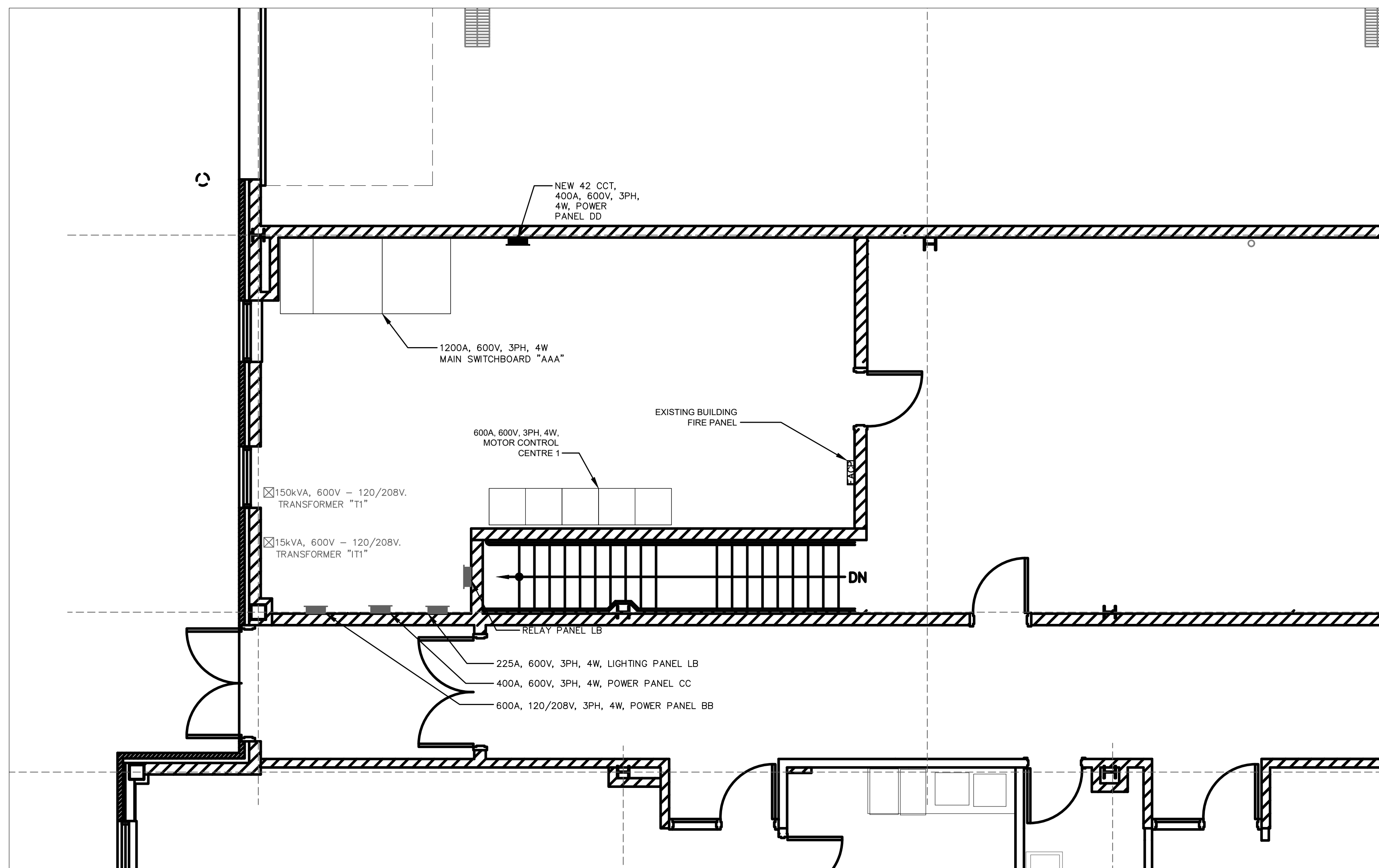
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1 POWER AND SYSTEMS – GENERATOR ROOM
 E-200 SCALE: 1:50

Panel DD						
LOAD	DESCRIPTION	CCT	BREAKER	PHASE	DESCRIPTION	LOAD
34053	RTU - 1	1	3P	A	RTU - 1 SUPPLEMENTAL HEAT	17474
34053		3		B		17474
34053		5	110A	C		60A
18203	RTU - 2 SUPPLEMENTAL HEAT	7	3P	A		
18203		9		B		
18203		11	60A	C		
18203		13		A		
		15		B		
		17		C		
		19		A		
		21		B		
		23		C		
		25		A		
		27		B		
		29		C		
		31		A		
		33		B		
		35		C		
		37		A		
		39		B		
		41		C		
156768						52422
600 VOLTAGE	PHASE A				WATTS	AMPS
3 PHASE	PHASE B				69730	200.96
400A MAIN BREAKER	PHASE C				69730	200.96
400A MAIN BUS	TOTAL				209190	201.30



2 POWER AND SYSTEMS – MEZZANINE ELECTRICAL ROOM
 E-200 SCALE: 1:50

No.	Revision	Date	By
1	ISSUED FOR PERMIT	2024.11.01	SJ
0	ISSUED FOR COORDINATION	2024.08.09	SJ

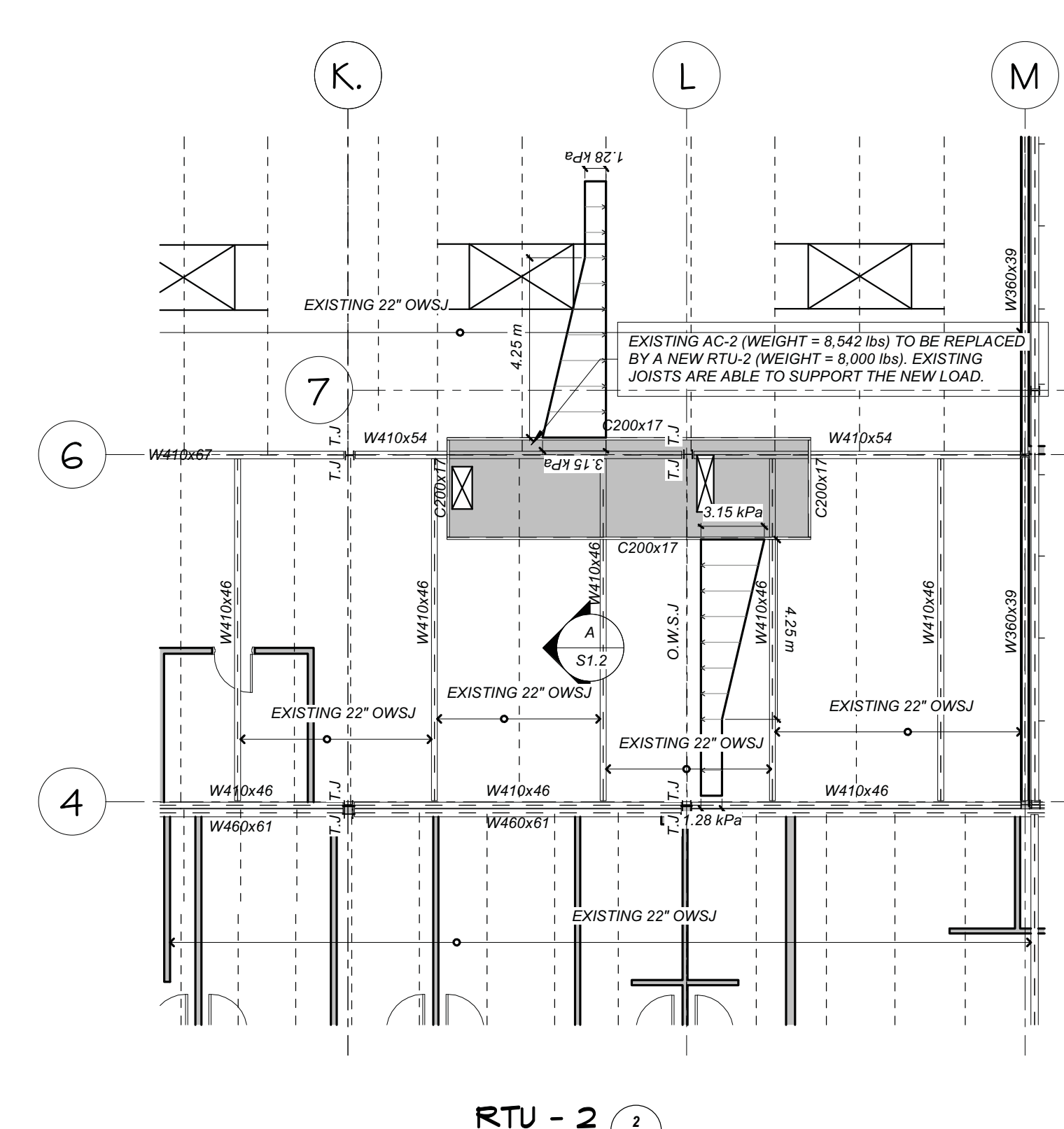
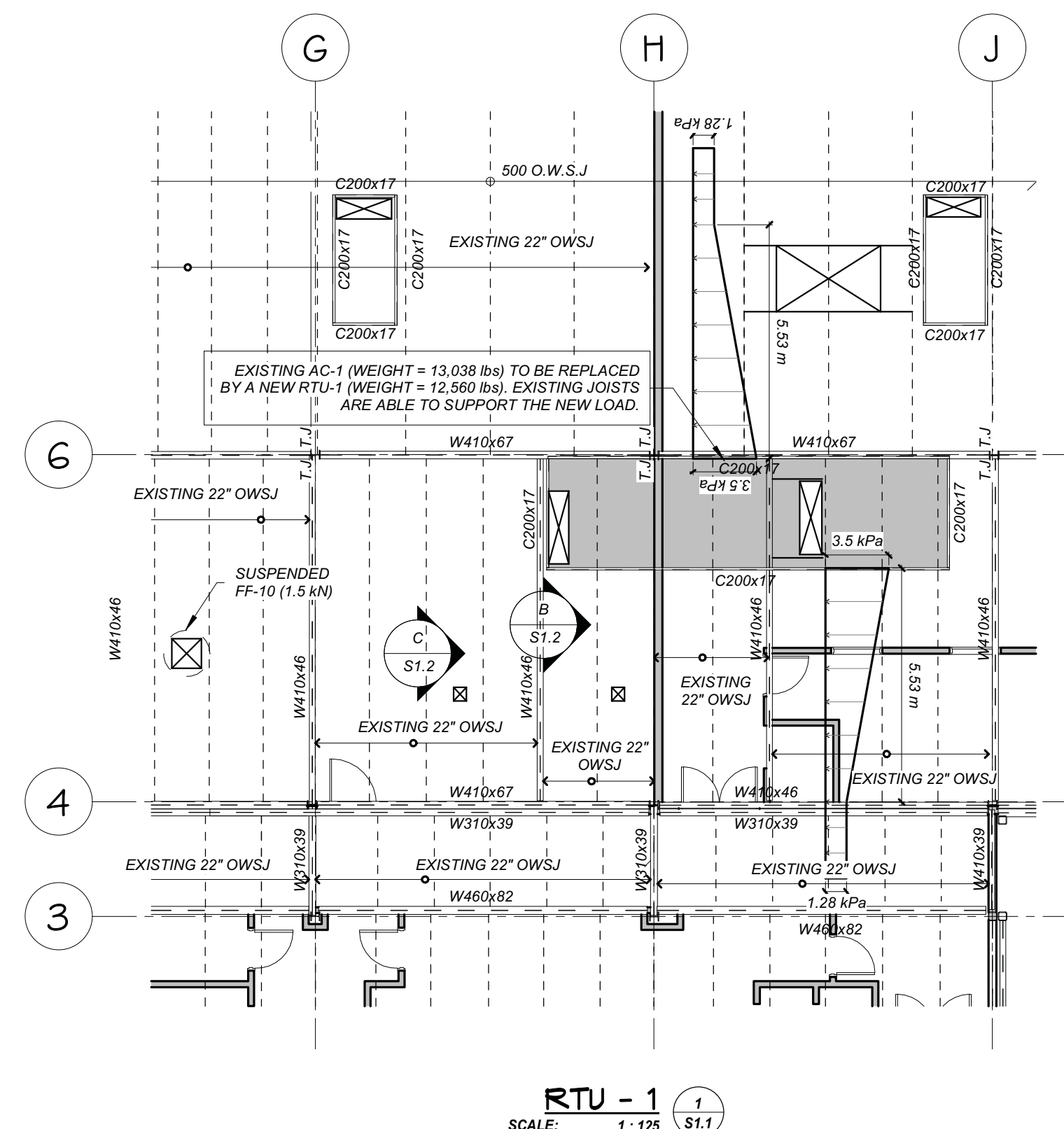
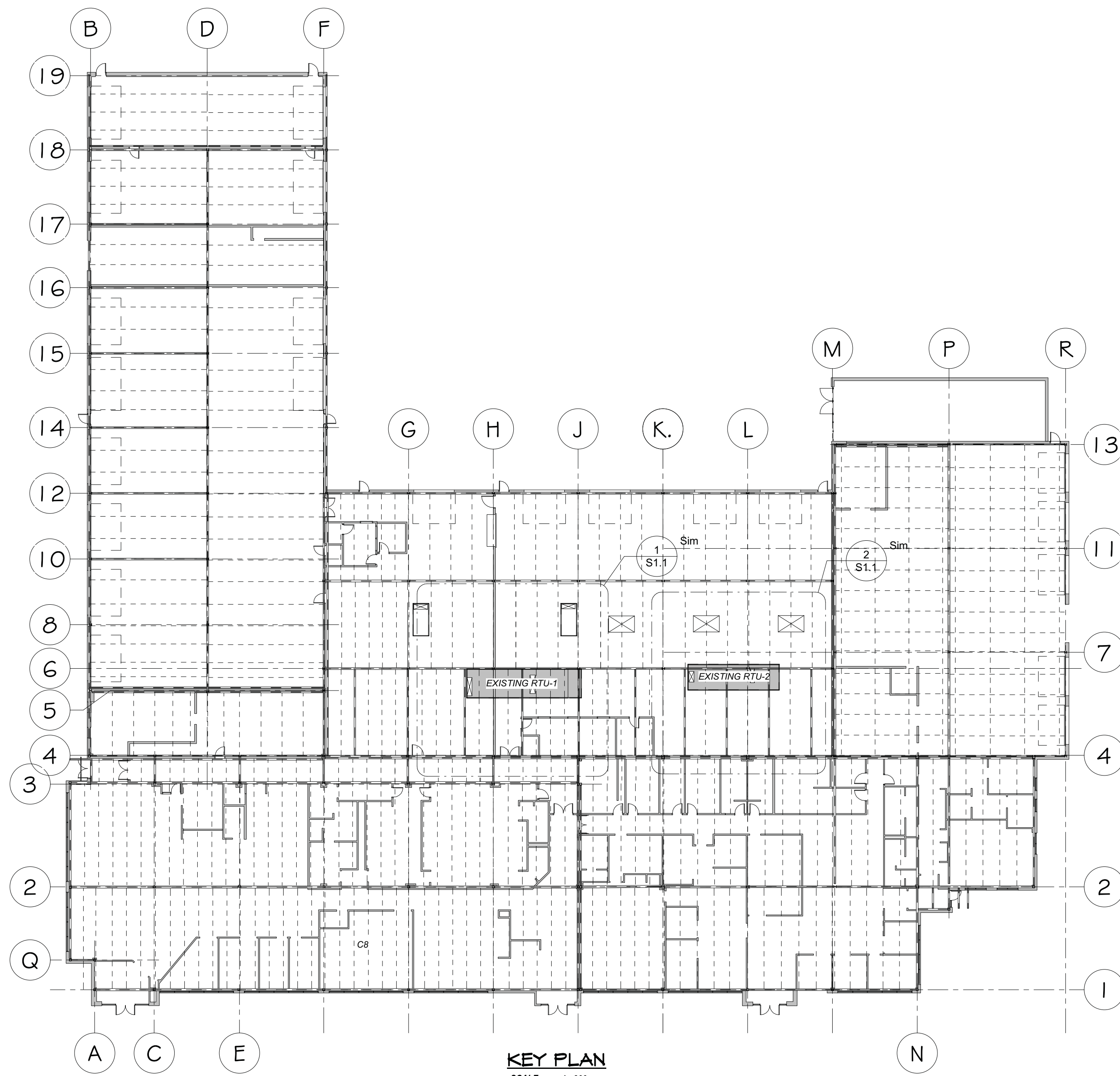
SEI
 Electrical Engineering
 12 Argyle Street N., Caledonia, ON, N3W 1B6
 www.sei-ee.com

Seal

Project
WOODLANDS OPERATION CENTRE
REPLACEMENT OF VARIOUS MECHANICAL EQUIPMENT
 1179 BRONTE RD, OAKVILLE, ON

Title
DETAILS

Drawn By: KM	Designed By: SJ	Approved By: KS	Date: AUGUST 2024
Project No. 24-114		Scale AS INDICATED	
Drawing No. E200		Sheet 4 of 4	Revision 1



GENERAL NOTES

- CHECK ALL DIMENSIONS ON THESE DRAWINGS WITH ALL OTHER DRAWINGS, INCLUDING BUT NOT LIMITED TO DRAWINGS PREPARED ARCHITECTURAL, MECHANICAL OR ELECTRICAL CONSULTANTS. REPORT ANY INCONSISTENCIES TO THE ARCHITECT OR ENGINEER PRIOR TO COMMENCING WITH THE WORK. DO NOT SCALE THE DRAWINGS.
- THE DESIGN LIVE LOADS ARE INDICATED ON THE DRAWINGS. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN LOADS.
- THE COMPLETED STRUCTURE IS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY BRACING, SHORING AND ANY OTHER TEMPORARY OR PERMANENT MEASURES AS REQUIRED DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY SUPPORT OF EXISTING OR ADJACENT STRUCTURES AS REQUIRED. ALL BRACING AND SHORING IS THE RESPONSIBILITY OF THE CONTRACTOR.
- CONSTRUCTION FEATURES NOT FULLY SHOWN ARE COMPARABLE TO SIMILAR CONDITION DETAILS.
- ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE LATEST ONTARIO BUILDING CODE, LATEST APPLICABLE REGULATIONS, AND GOOD CONSTRUCTION PRACTICES.
- THE STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND SPECIFICATIONS.
- CLARIFY ANY QUERIES WITH THE ENGINEER REGARDING THE INTERPRETATION OF THE DRAWINGS, PRIOR TO THE COMMENCEMENT OF ANY WORK.

STRUCTURAL STEEL NOTES

- ALL STRUCTURAL STEEL ELEMENTS, INCLUDING DESIGN OF ELEMENTS AND CONNECTIONS SHALL BE IN ACCORDANCE WITH CAN/CSA S16.
- ALL STRUCTURAL STEEL SHALL CONFORM TO CSA G40.21 (300W) EXCEPT W SECTIONS AND PLATES G40.21 (350W), HSS MEMBERS G40.21 (350W) CLASS C OR ASTM A500 GRADE C. ANCHOR BOLTS ASTM A307. COLD FORMED SECTIONS ASTM A570M GRADE 350W. UNLESS OTHERWISE NOTED, ALL SECTIONS SHALL BE PRIME PAINTED WITH THE SURFACE PREPARATION AND PAINTING PROCEDURES IN ACCORDANCE WITH CAN/CSA S5.10.
- ALL WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH CAN/CSA W59. THE STEEL FABRICATOR SHALL BE FULLY QUALIFIED UNDER THE REQUIREMENTS BY THE CANADIAN WELDING BUREAU IN CONFORMANCE WITH CAN/CSA W47.1.
- ERECT STRUCTURAL STEEL IN ACCORDANCE WITH CSA S16 AND IN CONFORMANCE WITH THE APPROVED SHOP DRAWINGS.

LOAD SUMMARY

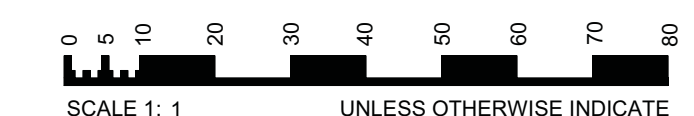
- DESIGN STANDARDS**
- ONTARIO BUILDING CODE, 2012, PART 4 - STRUCTURAL DESIGN
 - CAN/CSA-A23.3-14, DESIGN OF CONCRETE STRUCTURES
 - CAN/CSA-A23.4-16, DESIGN OF PRECAST CONCRETE STRUCTURES
 - CAN/CSA-S304.1-14, MASONRY DESIGN FOR BUILDINGS
 - CAN/CSA-S16-14, LIMIT STATES DESIGN OF STEEL STRUCTURES
 - CAN/CSA-S136-16, DESIGN OF COLD FORMED STEEL STRUCTURAL MEMBERS
 - CAN/CSA-086-14, ENGINEERING DESIGN IN WOOD

- SNOW, ICE AND RAIN LOADS**
- APPLIED PER OBC, PART 4, SECTION 4.1.6
- IMPORTANCE FACTOR, I_s : 1.0 (SLS) 1.0 (ULS)
 - GROUND SNOW LOAD, S_g : 1.1 kPa (23 PSF)
 - ASSOCIATED RAIN LOAD, S_r : 0.4 kPa (8.35 PSF)
 - WIND EXPOSURE FACTOR, C_w : 0.0
 - ROOF SNOW LOAD, S : 1.28 kPa (26.7 PSF)
 - DRIFT LOADS PER CLAUSE 4.1.6.2.(5) TO (7)

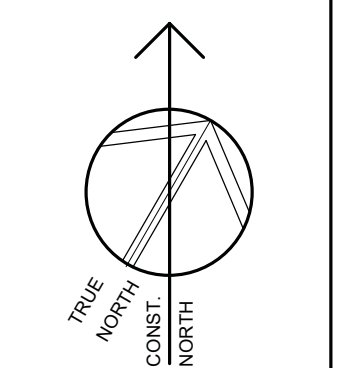
- DEAD LOADS**
- BASED ON EXISTING DRAWINGS
DEAD LOAD = 1.3 kPa (27.15 psf)

- SEISMIC LOADS**
- APPLIED PER OBC PART 4, SECTION 4.1.8
- IMPORTANCE FACTORS I_e : 1.0 (SLS) 1.0 (ULS)
 - $S_a(0.2)$: 0.32
 - $S_a(0.5)$: 0.17
 - $S_a(1.0)$: 0.065
 - $S_a(2.0)$: 0.022
 - PGA: 0.18
 - SOIL CLASS D (ASSUMED)
 - F_a : 1.18

- WIND LOADS**
- APPLIED PER OBC, PART 4, SECTION 4.1.7
- IMPORTANCE FACTOR, I_w : 1.0 (SLS) 1.0 (ULS)
 - REFERENCE VELOCITY PRESSURE FOR STRUCTURAL MEMBERS: 0.47 kPa 1/50 YEAR PROBABILITY (9.81 PSF)
 - REFERENCE VELOCITY PRESSURE FOR CLADDING & NON-STRUCTURAL MEMBERS: 0.36 kPa 1/10 YEAR PROBABILITY (7.5 PSF)
 - GUST FACTORS C_g : 2.0 FOR WHOLE & MAIN STRUCTURAL MEMBERS, 2.5 FOR SMALL ELEMENTS INCLUDING CLADDING, 2.0 FOR INTERNAL PRESSURES
 - BUILDING INTERNAL PRESSURE CATEGORY 2 PER NBC 2010 STRUCTURAL COMMENTARY (PART B), COMMENTARY B.



GENERAL CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ALL ERRORS AND OMISSIONS TO THE ARCHITECT. DO NOT SCALE THE DRAWINGS. DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS ISSUED BY THE ENGINEER FOR CONSTRUCTION.



No.	DATE	ISSUED FOR BUILDING PERMIT	REVISIONS
1	24/11/01	ISSUED FOR BUILDING PERMIT	

KALOS ENGINEERING
300 YORK BLVD HAMILTON, ONTARIO, L8R 3K6
PH. 905-333-9119 www.kaloseng.ca

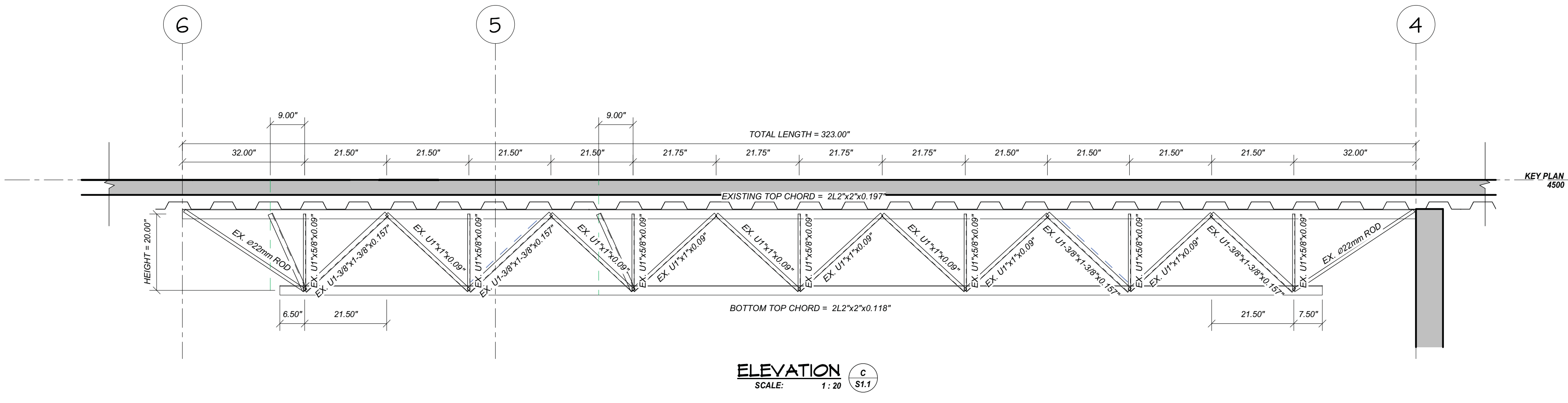
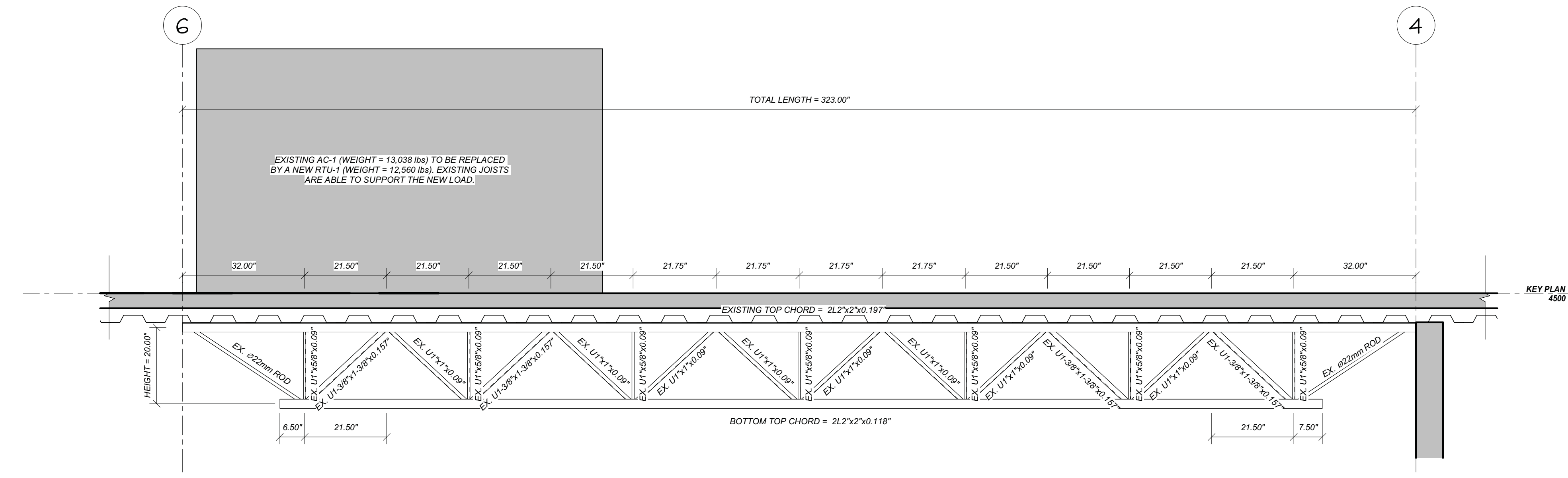
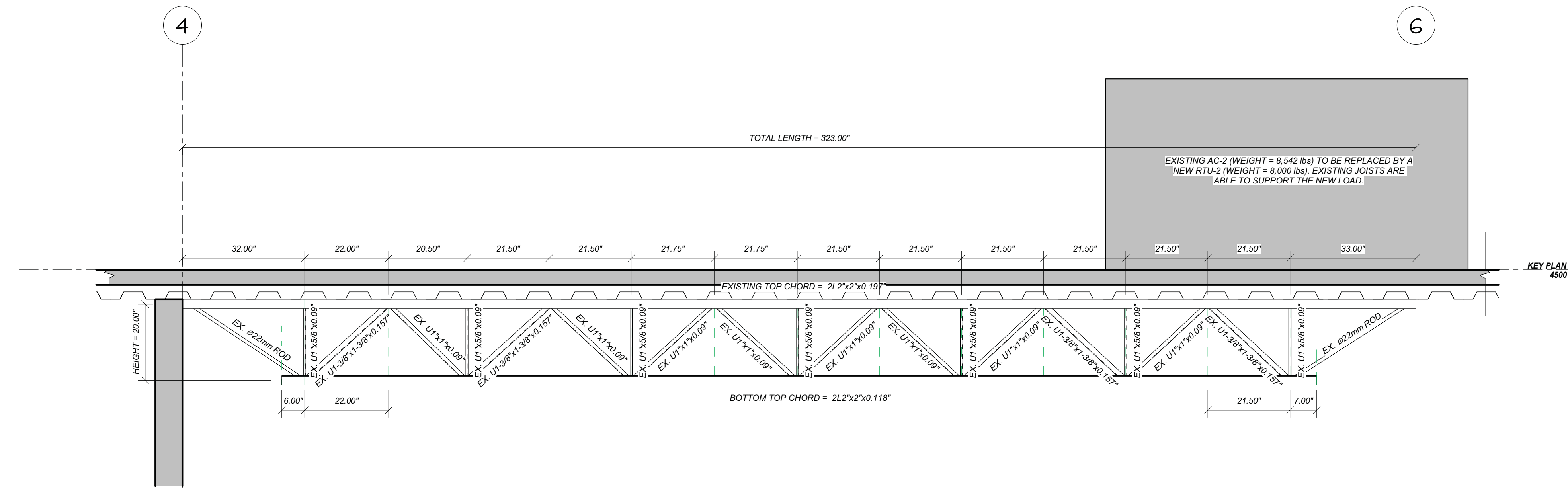
HALTON WOODLANDS OPERATION
1179 BRONTE RD, OAKVILLE, ON L6M 4G3

OAKVILLE ONTARIO
NEW RTU, ROOF FRAMING PLAN

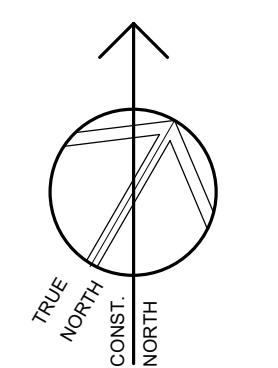
DATE: OCT. 2024	DRAWN BY: P.P	DRAWING No: S1.1
PROJECT No: 24122	CHECKED BY: J.P.C.	

PRINT DATE: 2024-10-21 1:59:18 PM

EXISTING INFORMATION REFERRED FROM CONTRACT No WS-1870(A)-01 SHEET: "PART ROOF FRAMING PLAN" DRAWING #: S4 TO S6



GENERAL CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ALL ERRORS AND OMISSIONS TO THE ARCHITECT. DO NOT SCALE THE DRAWINGS. DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL ISSUED BY THE ENGINEER FOR CONSTRUCTION.



No.	DATE	ISSUED FOR BUILDING PERMIT REVISIONS
1	24/11/01	ISSUED FOR BUILDING PERMIT

KALOS ENGINEERING
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HALTON WOODLANDS OPERATION
1179 BRONTE RD, OAKVILLE, ON L6M 4G3
OAKVILLE ONTARIO

ROOF FRAMING ELEVATIONS

DATE: OCT. 2024	DRAWN BY: P.P	DRAWING No: S1.2
PROJECT No: 24122	CHECKED BY: J.P.C.	

PRINT DATE: 2024-10-21 1:59:19 PM

EXISTING INFORMATION REFERRED FROM CONTRACT No WS-1870(A)-01 SHEET: "PART ROOF FRAMING PLAN" DRAWING #: S4 TO S6



Hazardous Building Materials Assessment (Pre-construction)

Mechanical Replacement
Project

Woodlands Operational Centre
1179 Bronte Road, Oakville,
Ontario

Prepared for:

The Regional Municipality of Halton

1151 Bronte Road
Oakville, Ontario, L6M 3L1

February 15, 2022

Pinchin File: 303884



Issued to: The Regional Municipality of Halton
Issued on: February 15, 2022
Pinchin File: 303884
Issuing Office: Hamilton, ON

Author: _____
Stephen Holmquist
Senior Project Technologist
289.339.8072
sholmquist@pinchin.com

Reviewer: _____
Leslie Heywood, BEng Mgt
Project Manager
289.237.4294
lheywood@pinchin.com



EXECUTIVE SUMMARY

The Regional Municipality of Halton (Client) retained Pinchin Ltd. (Pinchin) to conduct a hazardous building materials assessment at Woodlands Operational Centre located at 1179 Bronte Road, Oakville, Ontario. Pinchin performed the assessment on February 7, 2022.

The objective of the assessment was to identify specified hazardous building materials in preparation for building renovation. The proposed work as identified by the Client includes renovations to Mezzanine 1, Mezzanine 2, Vehicle Storage and Stock and Stores Room.

The results of this assessment are intended for use with a properly developed scope of work or performance specifications and safe work procedures.

The assessed area was limited to the part of the building, which consisted of the Mezzanine 1, Mezzanine 2, Vehicle Storage, Stock and Stores Room and Roof (above listed interior rooms). The assessed area is shown on the drawings in Appendix I.

SUMMARY OF FINDINGS

The following is a summary of significant findings; refer to the body of the report for detailed findings:

Asbestos:

- No asbestos-containing materials were identified within the assessed area.

Lead:

- Lead in paints is present in low levels
- Lead within batteries of emergency lights
- Electrical components, including wiring connectors, grounding conductors, and solder
- Solder on pipe connections

Silica: Crystalline silica is present in concrete, mortar, masonry, and drywall.

Mercury: Mercury vapour is present in lamp tubes.

Polychlorinated Biphenyls (PCBs): PCBs are not present.

Mould and Water Damage: Visible mould and water damage was not observed.



SUMMARY OF RECOMMENDATIONS

The following is a summary of significant recommendations; refer to the body of the report for detailed recommendations.

1. Conduct further investigation of the following items, which was not completed during this assessment:
 - a. Any materials listed as exclusions from this report.
2. Prepare a scope of work or specifications and safe work procedures for the hazardous materials removal required for the planned work.
3. Do not disturb suspected hazardous building materials discovered during the planned work, which have not been identified in this report and arrange for further evaluation and testing.
4. Remove and properly dispose of asbestos-containing materials prior to renovation activities.
5. Recycle mercury-containing lamp tubes when removed from service.
6. Follow appropriate safe work procedures when handling or disturbing asbestos, lead, silica and mould.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.



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APPENDICES

APPENDIX I	Drawings
APPENDIX II-A	Asbestos Analytical Certificates
APPENDIX II-B	Lead Analytical Certificates
APPENDIX III	Methodology
APPENDIX IV	Location Summary Report
APPENDIX V	Hazardous Materials Summary Report / Sample Log
APPENDIX VI	HMIS All Data Report



1.0 INTRODUCTION AND SCOPE

The Regional Municipality of Halton (Client) retained Pinchin Ltd. (Pinchin) to conduct a hazardous building materials assessment at Woodlands Operational Centre located at 1179 Bronte Road, Oakville, Ontario.

Pinchin performed the assessment on February 7, 2022. The surveyor was unaccompanied during the assessment. The assessed area was occupied at the time of the assessment.

The objective of the assessment was to identify specified hazardous building materials in preparation for building renovation activities.

The proposed renovations as identified by the Client include renovations to the Mechanical and MUA units.

The results of this assessment are intended for use with a properly developed scope of work or performance specification.

1.1 Scope of Assessment

The **assessed area** is limited to the portion(s) of the building to be renovated, as described by the Client and identified in the drawings in Appendix I.

The assessment was performed to establish the type of specified hazardous building materials, locations and approximate quantities incorporated in the structure(s) and its finishes.

For the purpose of the assessment and this report, hazardous building materials are defined as follows:

- Asbestos
- Lead
- Silica
- Mercury
- Polychlorinated Biphenyls (PCBs)
- Mould

The following Designated Substances are not typically found in building materials in a composition/state that is hazardous and were not included in this assessment:

- Arsenic
- Acrylonitrile
- Benzene



- Coke oven emissions
- Ethylene oxide
- Isocyanates
- Vinyl chloride monomer

2.0 METHODOLOGY

Pinchin conducted a room-by-room assessment (rooms, corridors, service areas, exterior, etc.) to identify the hazardous building materials as defined in the scope.

The assessment included limited demolition of wall and ceiling finishes (drywall or plaster) to view concealed conditions at representative areas as permitted by the current building use. Limited destructive testing of flooring was conducted where possible (under ceramic tiles, carpets or multiple layers of flooring). Demolition of exterior building finishes, masonry walls (chases, shafts etc.), and structural surrounds was not conducted.

Limited demolition of masonry block walls (core holes) was conducted to investigate for loose fill vermiculite insulation. Sampling of roofing materials was not conducted.

For further details on the methodology including test methods, refer to Appendix III.

3.0 BACKGROUND INFORMATION

3.1 Building Description

Description Item	Details
Use	Operations Facility
Number of Floors	The building is 1 storey plus mezzanine levels
Total Area	The assessed area is 8,000 square feet.
Year of Construction	The building was constructed in 2001.
Structure	Steel
Exterior Cladding	Brick
HVAC	Rooftop units
Roof	Built-up roofing
Flooring	Concrete
Interior Walls	Masonry and concrete
Ceilings	None

3.2 Existing Reports

No existing reports were provided for reference.

4.0 FINDINGS

The following section summarizes the findings of the assessment and provides a general description of the hazardous materials identified and their locations. For details on approximate quantities, condition, friability, accessibility and locations of hazardous materials; refer to the Hazardous Material Summary / Sample Log and All Data Report in Appendices V and VI.

Any quantities listed in this report or data tables are estimated based on visual approximations only and are subject to variation.

4.1 Asbestos

4.1.1 Pipe Insulation

Pipes are insulated with fibreglass, or other non-asbestos insulation such as mineral fibre or elastomeric foam insulation.

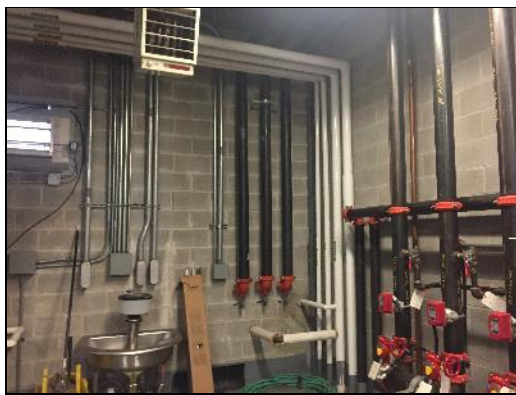


Photo 1

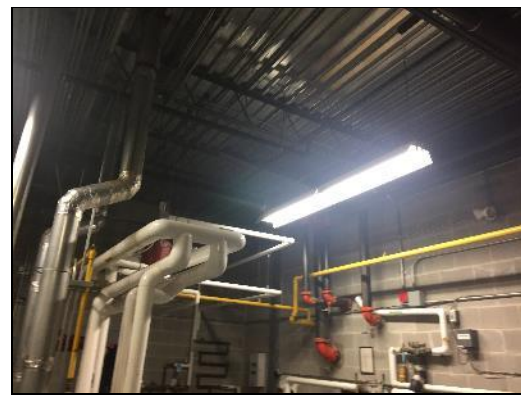


Photo 2

4.1.2 Duct Insulation and Mastic

Ducts are either uninsulated or insulated with non-asbestos fibreglass (canvas jacketing, photo 1).

Red mastic on exhaust ducts throughout the assessed areas does not contain asbestos (samples S0001A-C, photo 2).



Photo 1

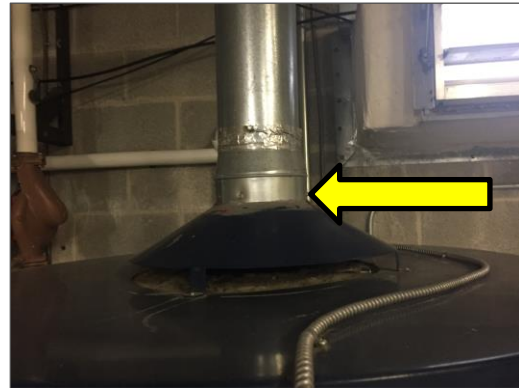


Photo 2

4.1.3 Mechanical Equipment Insulation

Mechanical equipment (e.g. hot water tanks, heating units) is either uninsulated or insulated with non-asbestos fibreglass (photos 1 and 2)



Photo 1

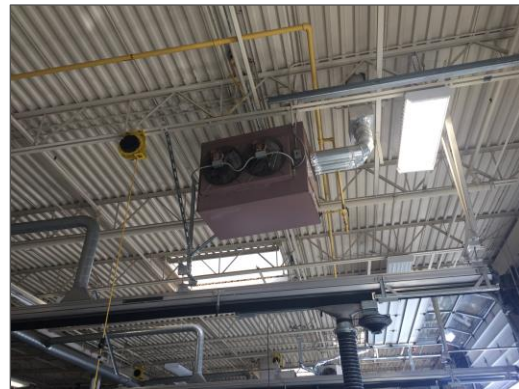


Photo 2

4.1.4 Vermiculite

Destructive testing was conducted in Mezzanine 1 on the masonry block wall. The locations of destructive testing have been indicated on the drawings in Appendix I.

Loose fill vermiculite was not observed within the cavities.



Photo 1

4.1.5 *Drywall Joint Compound*

Asbestos in drywall joint compound was banned in Canada in 1980. Drywall joint compound in the work area was installed on or after 2001 and is presumed to contain no asbestos.

4.1.6 *Firestopping*

Firestopping sealant present at pipe and conduit penetrations in Mezzanine 2 does not contain asbestos (samples S0002A-C, photo 1).



Photo 1

4.1.7 *Sealants, Caulking, and Putty*

The following table presents a summary of caulking, sealants and putties present:

Material, Colour and Photo #	Application	Sample Locations	Sample Number	Asbestos Type
Butyl sealant, black, Photo 1	Interior door windows	Mezzanine 2, Mezzanine 1 and Stock and Stores (Location 2, 1, and 4)	S0003A-C	None Detected
Caulking, grey, Photo 2	On AHU	Roof (Location 5)	S0004A-C	None Detected
Caulking, grey, Photo 3	On exhaust vents	Roof (Location 5)	S0005A-C	None Detected
Caulking, off-white, Photo 4	On exhaust vents	Roof (Location 5)	S0006A-C	None Detected

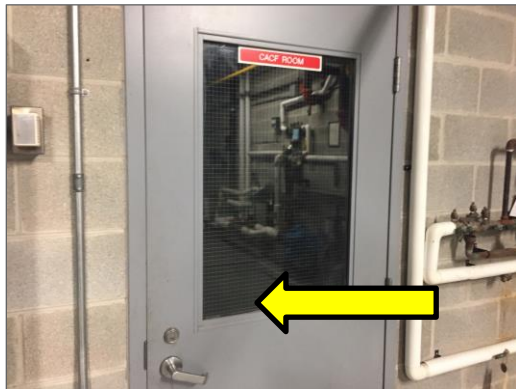


Photo 1



Photo 2



Photo 3



Photo 4

4.1.8 Roofing Products

Non-asbestos built-up roofing materials, based on the date of construction, are present within the assessed areas.



Photo 1

4.1.9 Excluded Materials

The following is a list of materials which may contain asbestos and was excluded from the assessment. These materials are presumed to contain asbestos until otherwise proven by sampling and analysis:

- Electrical components
- Mechanical packing, ropes and gaskets
- Fire resistant doors

4.2 Lead

4.2.1 Paints and Surface Coatings

The following table summarizes the analytical results of paints sampled.

Sample Number and Photo #	Colour, Substrate Description	Sample Location	Lead (%)
L0001, Photo 1	Beige on structural steel	Vehicle Storage Bay (Location 1)	0.0077
L0002, Photo 2	Yellow on gas line	Mezzanine 2 (Location 2)	<0.0041
L0003, Photo 3	Grey on AHU	Roof (Location 5)	0.022
L0004, Photo 4	Grey on metal structure	Stock and Stores (Location 4)	0.069

Results less than or equal to 0.1% (1,000 mg/kg), but equal to or greater than 0.009% (90 mg/kg), are considered low-level lead paints or surface coatings in accordance with the EACC guideline.

Paints containing less than 0.009% (90 mg/kg) lead is assumed to be insignificant.



Photo 1

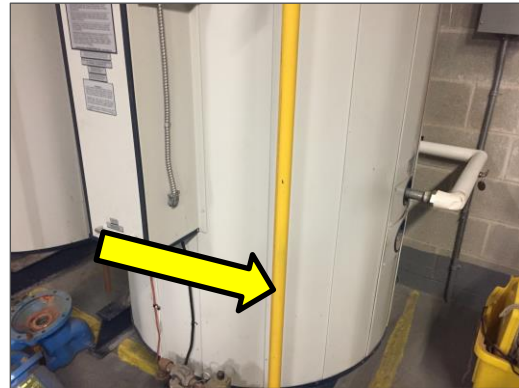


Photo 2



Photo 3



Photo 4

4.2.2 Lead Products and Applications

Lead-containing batteries may be present in emergency lighting.

4.2.3 Excluded Lead Materials

Lead is known to be present in a number of materials which were not assessed or sampled. The following materials, where found, should be presumed to contain lead.

- Electrical components, including wiring connectors, grounding conductors, and solder
- Solder on pipe connections

4.3 Silica

Crystalline silica is known to be a component of the following materials:

- Poured or pre-cast concrete
- Masonry and mortar
- Drywall



4.4 Mercury

4.4.1 Lamps

Mercury vapour is present in fluorescent lamp tubes and other lighting that is known to contain mercury such as mercury vapour lamps.

4.4.2 Mercury-Containing Devices

Mercury-containing devices were not found during the assessment.

4.5 Mould and Water Damage

Visible mould growth and water damage was not found during the assessment.

5.0 RECOMMENDATIONS

5.1 General

1. Prepare scope of work or performance specifications for hazardous material removal required for the planned work. The specifications should include, safe work practices, personal protective equipment, respiratory protection, and disposal of waste materials.
2. If suspected hazardous building materials are discovered during the planned work, which are not identified in this report, do not disturb and arrange for further testing and evaluation.
3. Conduct further investigation of the following items, which was not completed during this assessment:
 - b. Any materials listed as exclusions from this report
4. Provide this report and the detailed plans and specifications to the contractor prior to bidding or commencing work.
5. Retain a qualified consultant to specify, observe and document the successful removal of hazardous materials.
6. Update the asbestos inventory upon completion of the abatement and removal of asbestos-containing materials and any other relevant findings.

5.2 Building Renovation Work

The following recommendations are made regarding renovation involving the hazardous materials identified.



5.2.1 *Asbestos*

Sample excluded materials prior to renovation, alteration, or maintenance if suspected to be disturbed by the work.

Asbestos-containing materials must be disposed of at a landfill approved to accept asbestos waste.

5.2.2 *Lead*

For paints identified as having low levels of lead (i.e., less than the EACC guideline of 0.1% (1,000 mg/kg) for lead-containing paints but equal to or above 0.009% (90 mg/kg)) special precautions are not recommended unless aggressive disturbance (grinding, blasting, torching) is planned. Exposure from construction disturbance of paints containing lead less than 0.009% (90 mg/kg) is assumed to be insignificant.

Lead-containing items should be recycled when taken out of service.

5.2.3 *Silica*

Construction disturbance of silica-containing products may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with per applicable regulations and guidelines.

5.2.4 *Mercury*

Do not break lamps. Recycle and reclaim mercury from fluorescent lamps when taken out of service. Mercury is classified as a hazardous waste and must be disposed of in accordance with applicable regulations.

6.0 **TERMS AND LIMITATIONS**

This work was performed subject to the Terms and Limitations presented or referenced in the proposal for this project.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.



7.0 REFERENCES

The following legislation and documents were referenced in completing the assessment and this report:

Ontario

1. Asbestos on Construction Projects and in Buildings and Repair Operations, Ontario Regulation 278/05.
2. Designated Substances, Ontario Regulation 490/09.
3. Lead on Construction Projects, Ministry of Labour Guidance Document.
4. The Environmental Abatement Council of Canada (EACC) Lead Guideline for Construction, Renovation, Maintenance or Repair.
5. Ministry of the Environment Regulation, R.R.O. 1990 Reg. 347 as amended.
6. Ministry of the Environment Regulation, R.R.O. 1990 Reg. 362 as amended.
7. Silica on Construction Projects, Ministry of Labour Guidance Document.
8. Alert – Mould in Workplace Buildings, Ontario Ministry of Labour.

All jurisdictions

1. PCB Regulations, SOR/2008-273, Canadian Environmental Protection Act.
2. Surface Coating Materials Regulations, SOR/2016-193, Canada Consumer Product Safety Act.
3. Consolidated Transportation of Dangerous Goods Regulations, including Amendment SOR/2019-101, Transportation of Dangerous Goods Act.
4. Mould Guidelines for the Canadian Construction Industry, Standard Construction Document CCA 82 – 2004 (Revised 2018), Canadian Construction Association.
5. Ozone-depleting Substances and Halocarbon Alternatives Regulations, SOR/2016-137.






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Template: Master Report for Hazardous Materials Assessment (Pre-Construction), HAZ, July 29, 2021

APPENDIX I
Drawings



LEGEND

-  ASBESTOS BULK SAMPLE
-  LEAD BULK SAMPLE
-  PINCHIN LOCATION NUMBER
-  SURVEY BOUNDARY/ASSESSED AREA
-  INTRUSIVE INSPECTION

NOT ALL KNOWN OR SUSPECTED HAZARDOUS BUILDING MATERIALS MAY BE DEPICTED ON THE DRAWING. REFER TO THE HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER



PROJECT NAME:
HAZARDOUS BUILDING MATERIALS ASSESSMENT

CLIENT NAME:
REGION OF HALTON

PROJECT LOCATION:
**1179 BRONTE ROAD
OAKVILLE, ONTARIO**

FIGURE NAME:
FIRST FLOOR AND MEZZANINES

PROJECT NUMBER:
303884

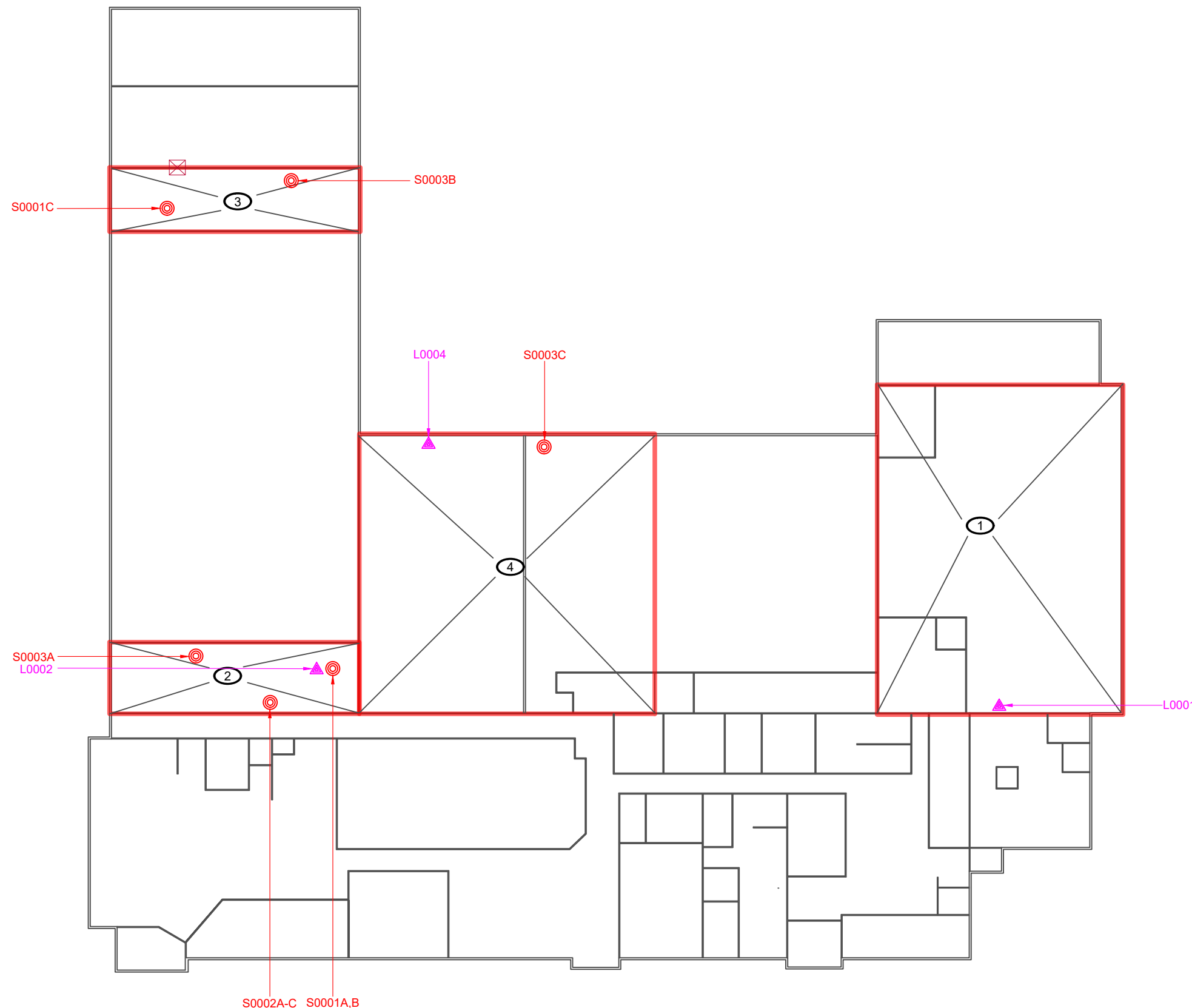
SCALE:
NOT TO SCALE

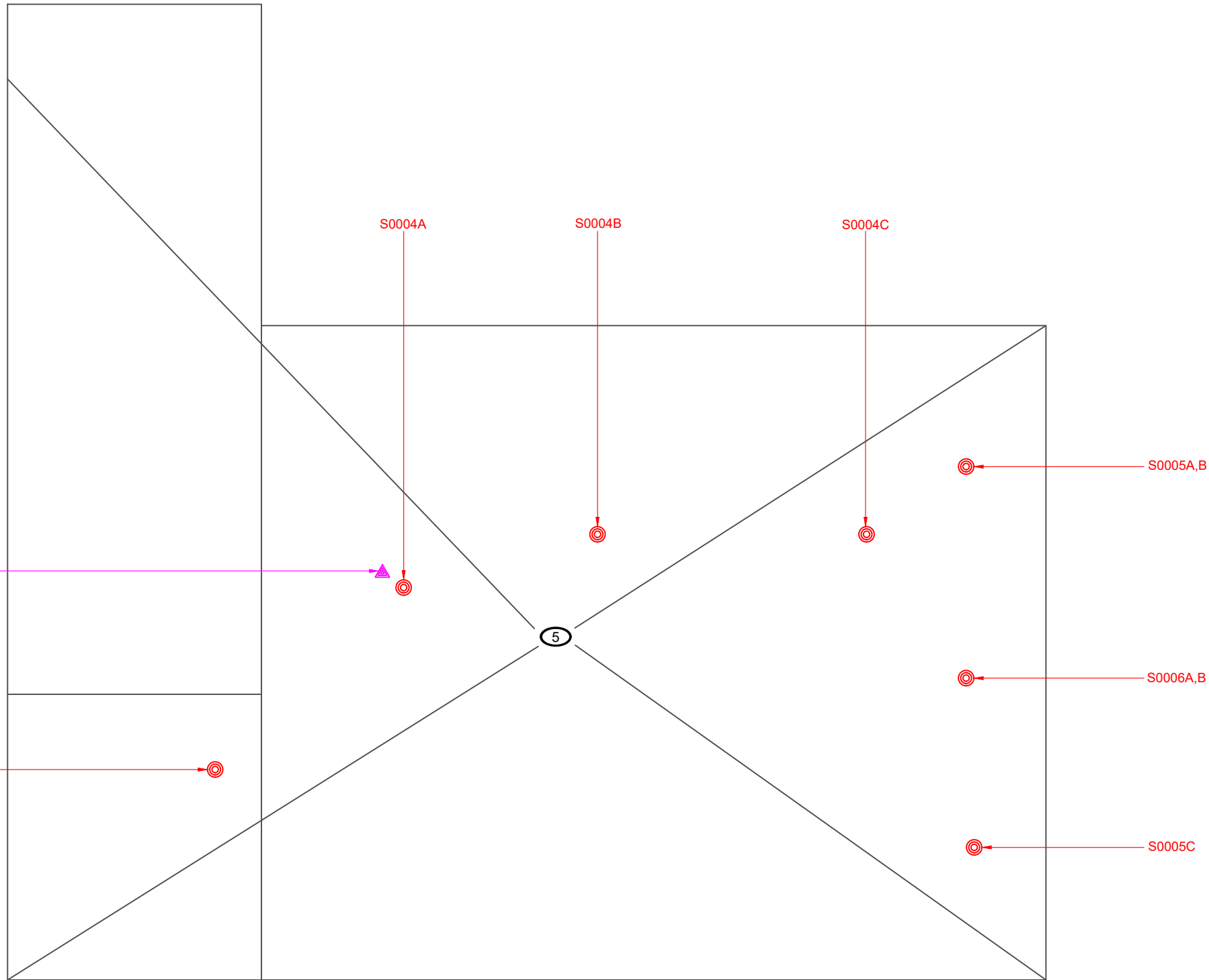
DRAWN BY:
RV

REVIEWED BY:
SH

DATE:
FEBRUARY 2022

FIGURE NUMBER:
1 OF 2





- LEGEND**
- ASBESTOS BULK SAMPLE
 - LEAD BULK SAMPLE
 - PINCHIN LOCATION NUMBER
 - SURVEY BOUNDARY/ASSESSED AREA
 - INTRUSIVE INSPECTION

NOT ALL KNOWN OR SUSPECTED HAZARDOUS BUILDING MATERIALS MAY BE DEPICTED ON THE DRAWING. REFER TO THE HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER



PROJECT NAME:
HAZARDOUS BUILDING MATERIALS ASSESSMENT

CLIENT NAME:
REGION OF HALTON

PROJECT LOCATION:
1179 BRONTE ROAD
OAKVILLE, ONTARIO

FIGURE NAME:
ROOF

PROJECT NUMBER: 303884	SCALE: NOT TO SCALE
DRAWN BY: RV	REVIEWED BY: SH
DATE: FEBRUARY 2022	FIGURE NUMBER: 2 OF 2

APPENDIX II-A
Asbestos Analytical Certificates



Pinchin Ltd. Asbestos Laboratory Certificate of Analysis

Project Name:	Halton Region, 1179 Bronte Rd Oakville ON		
Project No.:	0303884.000		
Prepared For:	S. Holmquist	Date Received:	February 8, 2022
Lab Reference No.:	b266061	Date Analyzed:	February 10, 2022
Analyst(s):	C. Luong	# Samples submitted:	18
		# Phases analyzed:	24

Method of Analysis:

EPA 600/R-93/116 - Method for the Determination of Asbestos in Bulk Building Materials dated July, 1993

Bulk samples are checked visually and scanned under a stereomicroscope. Slides are prepared and observed under a Polarized Light Microscope (PLM) at magnifications of 40X, 100X or 400X as appropriate. Asbestos fibres are identified by a combination of morphology, colour, refractive index, extinction, sign of elongation, birefringence and dispersion staining colours. A visual estimate is made of the percentage of asbestos present. A reported concentration of less than (<) the regulatory threshold indicates the presence of confirmed asbestos in trace quantities, limited to only a few fibres or fibre bundles in an entire sample. This method complies with provincial regulatory requirements where applicable. Multiple phases within a sample are analyzed and reported separately.

All bulk samples submitted to this laboratory for asbestos analysis are retained for a minimum of three months. Samples may be retrieved, upon request, for re-examination at any time during that period.

The Pinchin Ltd. Mississauga asbestos laboratory is accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 101270-0) for the 'EPA – 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples,' and the 'EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials'; and meets all requirements of ISO/IEC 17025:2017.

This report relates only to the items tested.

NOTE: *This test report may not be reproduced, except in full, without the written approval of the laboratory. The client may not use this report to claim product endorsement by NVLAP or any agency of the U.S. Government. This report is valid only when signed in blue ink by the analyst. Vinyl asbestos floor tiles contain very fine fibres of asbestos and may be missed by some laboratories using the PLM method. Internal verification studies performed by Pinchin indicate that the chance of missing asbestos in floor tiles is no higher than about 2%. The vinyl tile study and laboratory documentation on measurement uncertainty is available upon request. The analysis of dust samples by PLM cannot be used as an indicator of past or present airborne asbestos fibre levels.*



Pinchin Ltd. Asbestos Laboratory Certificate of Analysis

Project Name: Halton Region, 1179 Bronte Rd Oakville ON
Project No.: 0303884.000
Prepared For: S. Holmquist

Lab Reference No.: b266061
Date Analyzed: February 10, 2022

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0001A Caulking, Red, Loc:2, Mezzanine 2	Homogeneous, red, rubbery, caulking material.	None Detected	Non-Fibrous Material > 75%
S0001B Caulking, Red, Loc:2, Mezzanine 2	Homogeneous, red, rubbery, caulking material.	None Detected	Non-Fibrous Material > 75%
S0001C Caulking, Red, Loc:3, Mezzanine 1	Homogeneous, red, rubbery, caulking material.	None Detected	Non-Fibrous Material > 75%
S0002A Firestopping (mastic), Grey, Loc:2, Mezzanine 2	Homogeneous, grey, rubbery, mastic material.	None Detected	Non-Fibrous Material > 75%
S0002B Firestopping (mastic), Grey, Loc:2, Mezzanine 2	Homogeneous, grey, rubbery, mastic material.	None Detected	Non-Fibrous Material > 75%
S0002C Firestopping (mastic), Grey, Loc:2, Mezzanine 2	Homogeneous, grey, rubbery, mastic material.	None Detected	Non-Fibrous Material > 75%
Comments:	Foam is present on the surface of this sample.		
S0003A Caulking, Black Butyl Tape Interior Door, Loc:2, Mezzanine 2	Homogeneous, black, soft, sticky material.	None Detected	Cellulose 0.5-5% Non-Fibrous Material > 75%



Pinchin Ltd. Asbestos Laboratory Certificate of Analysis

Project Name: Halton Region, 1179 Bronte Rd Oakville ON
Project No.: 0303884.000
Prepared For: S. Holmquist

Lab Reference No.: b266061
Date Analyzed: February 10, 2022

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0003B Caulking, Black Butyl Tape Interior Door, Loc:3, Mezzanine 1	Homogeneous, black, soft, sticky material.	None Detected	Cellulose 0.5-5% Non-Fibrous Material > 75%
S0003C Caulking, Black Butyl Tape, Loc:4, Stock And Stores	Homogeneous, black, soft, sticky material.	None Detected	Cellulose 0.5-5% Non-Fibrous Material > 75%
S0004A Caulking, Grey On Ahu, Loc:5, Roof	Homogeneous, grey, caulking material.	None Detected	Non-Fibrous Material > 75%
S0004B Caulking, Grey On Ahu, Loc:5, Roof	Homogeneous, grey, caulking material.	None Detected	Non-Fibrous Material > 75%
S0004C Caulking, Grey On Ahu, Loc:5, Roof	2 Phases: a) Homogeneous, grey, sticky material.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, off- white, caulking material.	None Detected	Non-Fibrous Material > 75%
Comments:	Phase a) is small in size. For more reliable results, a larger sample is required.		
S0005A Caulking, Grey On Exhaust Vents, Loc:5, Roof	Homogeneous, silver, rubbery, caulking material.	None Detected	Non-Fibrous Material > 75%
S0005B Caulking, Grey On Exhaust Vents, Loc:5, Roof	Homogeneous, silver, rubbery, caulking material.	None Detected	Non-Fibrous Material > 75%



Pinchin Ltd. Asbestos Laboratory Certificate of Analysis

Project Name: Halton Region, 1179 Bronte Rd Oakville ON
Project No.: 0303884.000
Prepared For: S. Holmquist

Lab Reference No.: b266061
Date Analyzed: February 10, 2022

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0005C Caulking, Grey On Exhaust Vents, Loc:5, Roof	Homogeneous, silver, rubbery, caulking material.	None Detected	Non-Fibrous Material > 75%
S0006A Caulking, Off White On Exhaust Vents, Loc:5, Roof	a) Homogeneous, off-white, caulking material.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, off-white, soft, cementitious material.	None Detected	Non-Fibrous Material > 75%
S0006B Caulking, Off White On Exhaust Vents, Loc:5, Roof	a) Homogeneous, off-white, caulking material.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, white, soft, cementitious material.	None Detected	Non-Fibrous Material > 75%
	c) Homogeneous, black, tar material.	None Detected	Tar and other non-fibrous > 75%
S0006C Caulking, Off White On Exhaust Vents, Loc:5, Roof	a) Homogeneous, silver, rubbery, caulking material.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, grey, caulking material.	None Detected	Non-Fibrous Material > 75%
	c) Homogeneous, black, tar material.	None Detected	Tar and other non-fibrous > 75%

Reviewed by:

Reporting Analyst:

Analyzed by: C.L.
 Reviewed by: [Signature]
 Report Sent by: [Signature]

Pinchin Ltd. - Asbestos Laboratory Internal Asbestos Bulk Sample Chain of Custody

Client Name:	Halton Region	Project Address:	1179 Bronte Rd Oakville ON
Portfolio/Building No:		Pinchin File:	303884
Submitted by:	Stephen Holmquist	Email:	sholmquist@pinchin.com
CC Results to:		CC Email:	
Date Submitted:	February 07 2022	Required by:	Feb 10 2022
# of Samples:	18	Priority:	Rush
Year of Building Construction (Mandatory, Years ONLY):	2001		
Do NOT Stop on Positive (Sample Numbers):			
Pinchin Group Company (Mandatory Field):	Pinchin		
HMIS2 Building Reference #:	102104/2022178774470		
To be Completed by Lab Personnel Only:	6286061 @		
Lab Reference #:		Time:	24 hour clock
Received by:		Date:	Month Day Year
Name(s) of Analyst(s):	FEB 08 2022		Feb 10 2022

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0001	A	Caulking, Red, Loc:2, Mezzanine 2 NO
S	0001	B	Caulking, Red, Loc:2, Mezzanine 2 NO
S	0001	C	Caulking, Red, Loc:3, Mezzanine 1 NO
S	0002	A	Firestopping (mastic), Grey, Loc:2, Mezzanine 2 NO
S	0002	B	Firestopping (mastic), Grey, Loc:2, Mezzanine 2 NO
S	0002	C	Firestopping (mastic), Grey, Loc:2, Mezzanine 2 NO
S	0003	A	Caulking, Black Butyl Tape Interior Door, Loc:2, Mezzanine 2 NO
S	0003	B	Caulking, Black Butyl Tape Interior Door, Loc:3, Mezzanine 1 NO

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0003	C	Caulking,Black Butyl Tape,Loc:4,Stock And Stores ND
S	0004	A	Caulking,Grey On Ahu,Loc:5,Roof ND
S	0004	B	Caulking,Grey On Ahu,Loc:5,Roof ND
S	0004	C	Caulking,Grey On Ahu,Loc:5,Roof a)ND b)ND
S	0005	A	Caulking,Grey On Exhaust Vents,Loc:5,Roof ND
S	0005	B	Caulking,Grey On Exhaust Vents,Loc:5,Roof ND
S	0005	C	Caulking,Grey On Exhaust Vents,Loc:5,Roof ND
S	0006	A	Caulking,Off White On Exhaust Vents,Loc:5,Roof a)ND b)ND
S	0006	B	Caulking,Off White On Exhaust Vents,Loc:5,Roof a)ND b)ND c)ND
S	0006	C	Caulking,Off White On Exhaust Vents,Loc:5,Roof a)ND b)ND c)ND

APPENDIX II-B
Lead Analytical Certificates



Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3050B/6010C/7000B



Customer: Pinchin Ltd.
6-875 Main St West
Suite 200
Hamilton, Ontario L8S 4P9
Project: 303884

Attn: Stephen Holmquist

Lab Order ID: 71984997
Analysis ID: 71984997_PBP
Date Received: 2/8/2022
Date Reported: 2/9/2022

Sample ID	Description	Mass	Concentration	Concentration
Lab Sample ID	Lab Notes	(g)	(ppm)	(% by weight)
L0001	Struct, Metal, Beige,Loc:1,Vehicle Storage Bay	0.0582	77	0.0077%
71984997PBP_1				
L0002	Pipe, Metal, Yellow On Gas Line,Loc:2,Mezzanine 2	0.0974	< 41	< 0.0041%
71984997PBP_2				
L0003	Mech, Metal, Grey On AHU,Loc:5,Roof	0.0704	220	0.022%
71984997PBP_3				
L0004	Struct, Metal, Grey,Loc:4,Stock And Stores	0.0974	690	0.069%
71984997PBP_4				

Unless otherwise noted blank sample correction was not performed on analytical results. Scientific Analytical Institute participates in the AIHA ELPAT program. ELPAT Laboratory ID: 173190. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. Analytical uncertainty available upon request. The quality control samples run with the samples in this report have passed all EPA required specifications unless otherwise noted. RL: (Report Limit for an undiluted 50ml sample is 4µg Total Pb). Unless indicated, areas and volumes were provided by the customer.

Athena Summa (4)

Analyst

Laboratory Director

11984997

Version 1-15-2012

Client:	Pinchin Ltd.	*Instructions: Use Column "B" for your contact info To See an Example Click the bottom Example Tab. 4 Begin Samples with a "<<" above the first sample and end with a ">>" below the last sample. Only Enter your data on the first sheet "Sheet1" <i>Note: Data 1 and Data 2 are optional fields that do not show up on the official report, however they will be included in the electronic data returned to you to facilitate your reintegration of the report data.</i>
Contact:	Stephen Holmquist	
Address:	6-875 Main St W Hamilton ON	
Phone:		
Fax:		
Email:	sholmquist@pinchin.com	
Project:	303884	
Client Notes:	303884	
P.O. #:	303884.000	
Date Submitted:	Feb 7 2022	
Analysis:	Paint Chips Flame AA	
TurnAroundTime:	1 Day	

Scientific Analytical Institute

**4604 Dundas Dr.
 Greensboro, NC 27407
 Phone: 336.292.3888
 Fax: 336.292.3313
 Email: lab@sailab.com**

Sample Number	Data 1 (Lab use only)	Sample Description	Data 2 (Lab use only)
<<			
L0001		Struct, Metal, Beige, Loc:1, Vehicle Storage Bay	
L0002		Pipe, Metal, Yellow On Gas Line, Loc:2, Mezzanine 2	
L0003		Mech, Metal, Grey On AHU, Loc:5, Roof	
L0004		Struct, Metal, Grey, Loc:4, Stock And Stores	

Accepted
Rejected
Reilly 2/8
1130A

APPENDIX III
Methodology



1.0 GENERAL

An inspection was conducted to identify the type of Hazardous Building Materials incorporated in the structure and its finishes.

Information regarding the location and condition of hazardous building materials encountered and visually estimated quantities were recorded. The locations of any samples collected were recorded on small-scale plans. As-built drawings and previous reports were referenced where provided.

Sample collection was conducted in accordance with our Standard Operating Procedures.

1.1 Asbestos

The inspection for asbestos included friable and non-friable asbestos-containing materials (ACM). A friable material is a material that when dry can be crumbled, pulverized or powdered by hand pressure.

A separate set of samples was collected of each type of homogenous material suspected to contain asbestos. A homogenous material is defined by the US EPA as material that is uniform in texture and appearance, was installed at one time, and is unlikely to consist of more than one type or formulation of material. The homogeneous materials were determined by visual examination and available information on the phases of construction and prior renovations.

Samples were collected at a rate that is in compliance with the requirements of local regulations and guidelines. The sampling strategy was also based on known ban dates and phase out dates of the use of asbestos; sampling of certain building materials is not conducted after specific construction dates. In addition, to be conservative, several years past these dates are added to account for some uncertainty in the exact start / finish date of construction and associated usage of ACM. In some cases, manufactured products such as asbestos cement pipe were visually identified without sample confirmation.

The asbestos analysis was completed using a stop-positive approach. Only one result meeting the regulated criteria was required to determine that a material is asbestos-containing, but all samples must be analyzed to conclusively determine that a material is non-asbestos. The laboratory stopped analyzing samples from a homogeneous material once a result equal to or greater than the regulated criteria is detected in any of the samples of that material. All samples of a homogeneous material were analyzed if no asbestos is detected. In some cases, all samples were analyzed in the sample set regardless of result.

The analysis was performed in accordance with Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, July 1993.

Analytical results were compared to the following criteria.

Jurisdiction*	Friable	Non-Friable
Ontario	0.5%	0.5%

* If there is a conflict between federal and provincial criteria, the more stringent will apply.

Where building materials are described in the report as “non-asbestos” or “does not contain asbestos”, this means that either no asbestos was detected by the analytical method utilized in any of the multiple samples or, if detected, it is below the lower limit of an asbestos-containing material in the applicable regulation. Additionally, these terms are used for materials which historically are known to not include asbestos in their manufacturing.

Asbestos materials were evaluated in order to make recommendations regarding any remedial work. The priority for remedial action was based on several factors:

- Friability (friable or non-friable);
- Condition (good, fair, poor, debris);
- Accessibility (ranking from accessible to all building users to inaccessible);
- Visibility (whether the material is obscured by other building components).
- Efficiency of the work (for example, if damaged ACM is being removed in an area, it may be most practical to remove all ACM in the area even if it is in good condition).

1.2 Lead

Samples of distinctive paint finishes, and surface coatings present in more than a limited application, where removal of the paint is possible was collected. The samples were collected by scraping the painted finish to include base and covering applications.

Analysis for lead in paints or surface coatings was performed in accordance with EPA Method No. 3050B/Method No. 7420; flame atomic absorption.

Analytical results were compared to the following criteria.

Jurisdiction*	Units (%)	Units (ppm) / (mg/kg)
Ontario	0.1	1000

* If there is a conflict between federal and provincial criteria, the more stringent will apply.

Other lead building products (e.g. batteries, lead sheeting, flashing) were identified by visual observation only.



1.3 Silica

Building materials known to contain crystalline silica (e.g. concrete, cement, tile, brick, masonry, mortar) were identified by visual inspection only. Pinchin did not perform sampling of these materials for laboratory analysis of crystalline silica content.

1.4 Mercury

Building materials, products or equipment (e.g. thermostats, barometers, pressure gauges, lamp tubes), suspected to contain mercury was identified by visually inspection only. Dismantling of equipment suspected of containing mercury was not performed. Sampling of these materials for laboratory analysis of mercury content was not performed.

1.5 Visible Mould

The presence of mould or water damage was determined by visual inspection of exposed building surfaces. If any mould growth or water damage was concealed within building cavities it was not addressed in this assessment.

Template: Methodology for Hazardous Building Materials Assessment, HAZ, November 23, 2021

APPENDIX IV
Location Summary Report

Client: Halton Region

Site: 1179 Bronte Road, Oakville, ON

Building Name: Woodlands Operational Centre

Survey Date:

Last Re-Assessment:

Location No.	Name or Description	Area ft ²	Floor No.	Bldg. Phase	Notes
1	Vehicle Storage Bay	0		A	
2	Mezzanine 2	0		A	
3	Mezzanine 1	0		A	
4	Stock And Stores	0		A	
5	Roof	0		A	

APPENDIX V
Hazardous Materials Summary Report / Sample Log

Client: Halton Region

Site: 1179 Bronte Road, Oakville, ON

Building Name: Woodlands Operational Centre

Survey Date:

HAZMAT	Sample No	System/Material/Sample Description	Locations	Bldg. Phase	LF	SF	EA	%	Type	Positive	Friability
Asbestos	S0001 ABC	Other Caulking Red	2,3	A	60	0	0	0	None Detected	No	
Asbestos	S0002 ABC	Other Firestopping (mastic) Grey	2	A	30	0	0	0	None Detected	No	
Asbestos	S0003 ABC	Other Caulking Black Butyl Tape Interior Door	2,3,4	A	0	0	3	0	None Detected	No	
Asbestos	S0004 ABC	Other Caulking Grey On Ahu	5	A	100	0	0	0	None Detected	No	
Asbestos	S0005 ABC	Other Caulking Grey On Exhaust Vents	5	A	20	0	0	0	None Detected	No	
Asbestos	S0006 ABC	Other Caulking Off White On Exhaust Vents	5	A	10	0	0	0	None Detected	No	
Paint	L0001	Structure Metal Beige	1	A	0	0	0	100		No	-
Paint	L0002	Piping Metal Yellow On Gas Line	2,3	A	0	0	0	100		No	-
Paint	L0003	Mechanical Equipment Metal Grey On Ahu	5	A	0	0	0	100	Lead (Low)	Yes	-
Paint	L0004	Structure Metal Grey	4	A	0	0	0	100	Lead (Low)	Yes	-
Lead Product	V9000	Batteries In Emer. Lights	1,2,3,4	A	0	0	4	0	Lead Product	Yes	-
Hg	V9000	Fluorescent Light Tube	1,2	A	0	0	0	50	Hg	Yes	-
Hg	V9000	Fluorescent Light Tube	3	A	0	0	0	25	Hg	Yes	-
Hg	V9000	Fluorescent Light Tube	4	A	0	0	0	25	Hg	Yes	-

Legend:

Sample number		Units			
S####	Asbestos sample collected	SF	Square feet	NF	Non Friable material.
L####	Paint sample collected	LF	Linear feet	F	Friable material
P####	PCB sample collected	EA	Each	PF	Potentially Friable material
M####	Mould sample collected	%	Percentage		
V####	Material visually similar to numbered sample collected				
V0000	Known non Hazardous Material				
V9000	Material is visually identified as Hazardous Material				
V9500	Material is presumed to be Hazardous Material				
[Loc. No.]	Abated Material				

APPENDIX VI
HMIS All Data Report

Client: Halton Region
Location: #1 : Vehicle Storage Bay
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling		None Found														
Duct		Fibreglass		Canvas	C	Y										
Duct	All	Not Insulated			C	Y										
Floor	All	Concrete (poured)			A	Y										
Mechanical Equipment	All	Not Insulated			C	Y										
Piping		Not Insulated			C	Y										
Structure	All	Steel			C	Y										
Wall	All	Masonry			A	Y										

Client: Halton Region
Location: #1 : Vehicle Storage Bay
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PAINT									
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard	
Structure	Metal	100		%	L0001	Beige	Pb: 0.0077 %	No	

Client: Halton Region
Location: #1 : Vehicle Storage Bay
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA		Yes

Client: Halton Region
Location: #1 : Vehicle Storage Bay
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

MERCURY				
Component	Quantity	Unit	Sample	Hazard
FLUORESCENT LIGHT TUBE	100	%	V9000	Yes

Client: Halton Region
Location: #2 : Mezzanine 2
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling		None Found														
Duct		Fibreglass		Canvas	C	Y										
Duct	All	Not Insulated			C	Y										
Floor	All	Concrete (poured)			A	Y										
Mechanical Equipment	Domestic Hot Water Tank	Fibreglass			A	Y										
Other		Caulking, Red			A	Y		10			LF	S0001AB	None Detected	N.D.	None	
Other		Caulking, Black butyl tape interior door			A	Y		1			EA	S0003A	None Detected	N.D.	None	
Other		Firestopping (mastic), Grey			A	Y		30			LF	S0002ABC	None Detected	N.D.	None	
Piping		Fibreglass			A	Y										
Piping		Not Insulated			C	Y										
Structure	All	Steel			C	Y										
Wall	All	Masonry			A	Y										

Client: Halton Region
Location: #2 : Mezzanine 2
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PAINT									
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard	
Piping	Metal	100		%	L0002	Yellow on gas line	Pb: <0.0041 %	No	

Client: Halton Region
Location: #2 : Mezzanine 2
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA		Yes

Client: Halton Region
Location: #2 : Mezzanine 2
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

MERCURY				
Component	Quantity	Unit	Sample	Hazard
FLUORESCENT LIGHT TUBE	100	%	V9000	Yes

Client: Halton Region
Location: #3 : Mezzanine 1
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling		None Found														
Duct		Fibreglass		Canvas	C	Y										
Duct	All	Not Insulated			C	Y										
Floor	All	Concrete (poured)			A	Y										
Mechanical Equipment	Air Handling Unit	Fibreglass		Canvas	A	Y										
Other		Caulking, Red			A	Y		50			LF	S0001C	None Detected	N.D.	None	
Other		Caulking, Black butyl tape interior door			A	Y		1			EA	S0003B	None Detected	N.D.	None	
Piping		Fibreglass			A	Y										
Piping		Not Insulated			C	Y										
Structure	All	Steel			C	Y										
Wall	All	Masonry			A	Y										

Client: Halton Region
Location: #3 : Mezzanine 1
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PAINT									
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard	
Piping	Metal	100		%	V0002	Yellow on gas line	Pb: <0.0041 %	No	

Client: Halton Region
Location: #3 : Mezzanine 1
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA		Yes

Client: Halton Region
Location: #3 : Mezzanine 1
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Fluorescent Light Tube	100	%	V9000	Yes

Client: Halton Region
Location: #4 : Stock And Stores
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling		None Found														
Duct		Fibreglass		Canvas	C	Y										
Duct	All	Not Insulated			C	Y										
Floor	All	Concrete (poured)			A	Y										
Mechanical Equipment	All	Not Insulated			C	Y										
Mechanical Equipment	Domestic Hot Water Tank	Fibreglass			A	Y										
Other		Caulking, Black butyl tape			A	Y		1			EA	S0003C	None Detected	N.D.	None	
Piping		Not Insulated			C	Y										
Structure	All	Steel			C	Y										
Wall	All	Masonry			A	Y										

Client: Halton Region
Location: #4 : Stock And Stores
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PAINT									
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard	
Structure	Metal	100		%	L0004	Grey	Pb: 0.069 %	Lead (Low)	

Client: Halton Region
Location: #4 : Stock And Stores
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA		Yes

Client: Halton Region
Location: #4 : Stock And Stores
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

MERCURY				
Component	Quantity	Unit	Sample	Hazard
FLUORESCENT LIGHT TUBE	100	%	V9000	Yes

Client: Halton Region
Location: #5 : Roof
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Mechanical Equipment	All	Not Insulated			A	Y										
Other		Caulking, Grey on AHU			B	Y		100			LF	S0004ABC	None Detected	N.D.	None	
Other		Caulking, Grey on exhaust vents			B	Y		20			LF	S0005ABC	None Detected	N.D.	None	
Other		Caulking, Off white on exhaust vents			B	Y		10			LF	S0006ABC	None Detected	N.D.	None	

Client: Halton Region
Location: #5 : Roof
Survey Date: 2022-02-07

Site: 1179 Bronte Road, Oakville, ON
Floor:

Building Name: Woodlands Operational Centre
Room #:
Last Re-Assessment:

Area (sqft): 0

PAINT									
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard	
Mechanical Equipment	Metal	100		%	L0003	Grey on AHU	Pb: 0.022 %	Lead (Low)	

Legend:



Sample number		Units		Other	
S####	Asbestos sample collected	SF	Square feet	A	Access
L####	Paint sample collected	LF	Linear feet	V	Visible
P####	PCB sample collected	EA	Each	AP	Air Plenum
M####	Mould sample collected	%	Percentage	F	Friable material
V####	Material is visually identified to be identical to S####	LF	Linear feet	NF	Non Friable material
V0000	Known non hazardous material			PF	Potentially Friable material
V9000	Material visually identified as a Hazardous Material			Pb	Lead
V9500	Material is presumed to be a hazardous material			Hg	Mercury
				As	Arsenic
				Cr	Chromium

Access	
A	Accessible to all building occupants
B	Accessible to maintenance and operations staff without a ladder
C	Accessible to maintenance and operations staff with a ladder. Also rarely entered, locked areas
D	Not normally accessible

Condition	
Good	No visible damage or deterioration
Fair	Minor, repairable damage, cracking, delamination or deterioration
Poor	Irreparable damage or deterioration with exposed and missing material

Visible	
Y	The material is visible when standing on the floor of the room, without the removal or opening of other building components (e.g. ceiling tiles or access panels).
N	The material is not visible to view when standing on the floor of the room and requires the removal of a building component (e.g. ceilings tiles or access panels) to view and access. Includes rarely entered crawlspaces, attic spaces, etc. Observations will be limited to the extent visible from the access points.

Air Plenum	
Yes or No	The material is in a return air plenum or in a direct airstream or there is evidence of air erosion (e.g. duct for heating or cooling blowing directly on or across an ACM). This field is only completed where Air Plenum consideration is required by regulation.

Colour Coding	
	The material is known to contain regulated concentrations of asbestos; either by analytical results or visible identification (use of the V9000 code).
	The material is presumed to contain asbestos; based on visual appearances; typically a material known to historically contain asbestos; however, not sampled due to limited access or the destructive nature of the sampling.

Action					
(1)	Clean up of ACM Debris	(2)	Precautions for Access Which may Disturb ACM Debris	(3)	ACM removal
(4)	Precautions for Work Which may Disturb ACM in Poor Condition	(5)	Proactive ACM removal (Minimum repair required for fair condition)	(6)	ACM repair
(7)	Management program and surveillance				