Hamilton

CITY OF HAMILTON

REQUEST FOR TENDERS

Contract Number: C13-13-25

General Contractor Required for Domestic Hot Water (DHW) Solar Thermal and Unit Heaters Upgrade at Wentworth Street Operations Centre

Closes: 3:00 PM, Hamilton time
Tuesday February 18, 2025

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

Procurement Section
Corporate Services Department

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Revised: March 21, 2023

Contract Number: C13-13-25

General Contractor Required for Domestic Hot Water (DHW) Solar Thermal and Unit Heaters Upgrade at Wentworth Street Operations Centre.

All questions related to this Request for Tenders (RFT) or for clarification on completing the Form of Tender shall be submitted through the Bidding System by clicking on the "Submit a Question" button for the specified Request for Tenders document and shall be directed to:

Vanja Tokic
Procurement Specialist

All questions related to this Request for Tenders (RFT) or any clarification with respect to this RFT must be made no later than **3 Business Days prior** to the closing date of this RFT in order that City staff may have sufficient time to respond. The City reserves the right to extend the deadline for questions if required regarding this RFT.

Written answers or clarifications to issues of substance shall be shared with all bidders and issued as part of the RFT in the form of an Addendum. **All bidders are advised that any Addenda issued will only be posted on the following website:**

https://hamilton.bidsandtenders.ca

It is the sole responsibility of each bidder to check the website for any and all Addenda that have been issued for this Request for Tenders.

City of Hamilton
Corporate Services Department
Procurement Section
Email: procurement@hamilton.ca

Vanja Tokic
Procurement Specialist
Email:Vanja.Tokic@hamilton.ca

REQUEST FOR TENDERS NOTICE

Contract Number: C13-13-25

General Contractor Required for Domestic Hot Water (DHW) Solar Thermal and Unit Heaters Upgrade at Wentworth Street Operations Centre

Closes: 3:00 PM, Hamilton time
Tuesday February 18, 2025

Only electronic bid submissions shall be accepted and received through the Bidding System by the closing date and time stated above.

There is no public opening for this Request for Tenders.

1.0 SCOPE OF WORK

The project involves the removal and replacement of outdated natural gas heaters with twenty-eight (28) new units with at least 83% thermal efficiency, along with eleven (11) electric heaters of equivalent heating capacity. This project will also include the installation of three (3) new solar thermal domestic hot-water systems to supplement the existing DHW storage tanks. Contractor is to provide all labour, materials, plant, and equipment necessary to replace existing gas-fired unit heaters in workshop and maintenance areas, as specified in the tender documents, general requirements, drawings and specifications.

This Work will involve removing existing unit heaters and installing new high-efficiency unit heaters located in workshop areas as outlined in the specifications and drawings accompanying this tender. Contractor will be responsible to perform the disconnect of current unit heaters and connection of new unit heaters to existing gas and vent piping. Contractor is responsible for the safe disposal of the old unit heaters.

This Work will also involve installing a new solar thermal domestic hot water system located at roof level, and within the mechanical rooms as outlined in the specifications and drawings accompanying this tender. Contractor will be responsible to perform the connection of new solar heating equipment to existing

domestic hot water equipment and piping. Contractor is responsible for the safe disposal of any plumbing Works related to the installation.

2.0 CONTRACT REQUIREMENTS

Bidders are advised of the following contract requirements for this Request for Tenders:

2.1 Bid Security

Bid security: **$37,000.00.**

The City will only accept a digital bid bond in an electronically verifiable and enforceable (e-Bond) format.

2.2 Performance and/or Labour and Material Payment Security

Successful Bidder to provide:
Performance security (bond only accepted): **50%** of the Base Bid Price.

Successful Bidder to provide:
Labour and Material Payment security (bond only accepted): **50%** of the Base Bid Price.

2.3 Securities

There is no bid security, performance security or labour and material payment security required for this Request for Tenders.

3.0 SITE MEETINGS

3.1 Optional Site Meeting

There is an optional site meeting scheduled.

Location: **330 Wentworth Street North Hamilton, Ontario L8L 5W2. (see location map attached)**
Date: **Thursday, February 6,2025**
Time: **10:00 AM, Hamilton time**

All attendees are required to wear CSA approved hard hats and safety boots. If an attendee does not have the required personal protection equipment, they may not be allowed to attend the site meeting.

4.0 TO OBTAIN DOCUMENTS

4.1 Free Preview of Request for Tenders Documents

A complete set of Request for Tenders documents may be viewed for free on the City of Hamilton's bid opportunities website **hamilton.bidsandtenders.ca.**

4.2 Purchase of Request for Tenders Documents

The Request for Tenders documents are available for online purchase only.

Online: **hamilton.bidsandtenders.ca**

Fee: $61.44 non-refundable, tax included + applicable bids&tenders™ fees

4.3 Accommodations for Bidders with Disabilities

In accordance with the Ontario Human Rights Code, Ontarians with Disabilities Act, 2001 (ODA) and Accessibility for Ontarians with Disabilities Act, 2005 (AODA), the City of Hamilton will accommodate for a disability, ensuring full and equitable participation throughout the bid process.

If a bidder requires this Request for Tenders in a different format to accommodate a disability, the bidder must contact the Tender Coordinator as soon as possible and in any event prior to the closing date. The Request for Tenders in the different format will be issued only to the requesting bidder and all Addenda will be issued in such different format only to the requesting bidder.

5.0 TRADE AGREEMENTS

This Request for Tenders is subject to the Canadian Free Trade Agreement (CFTA).

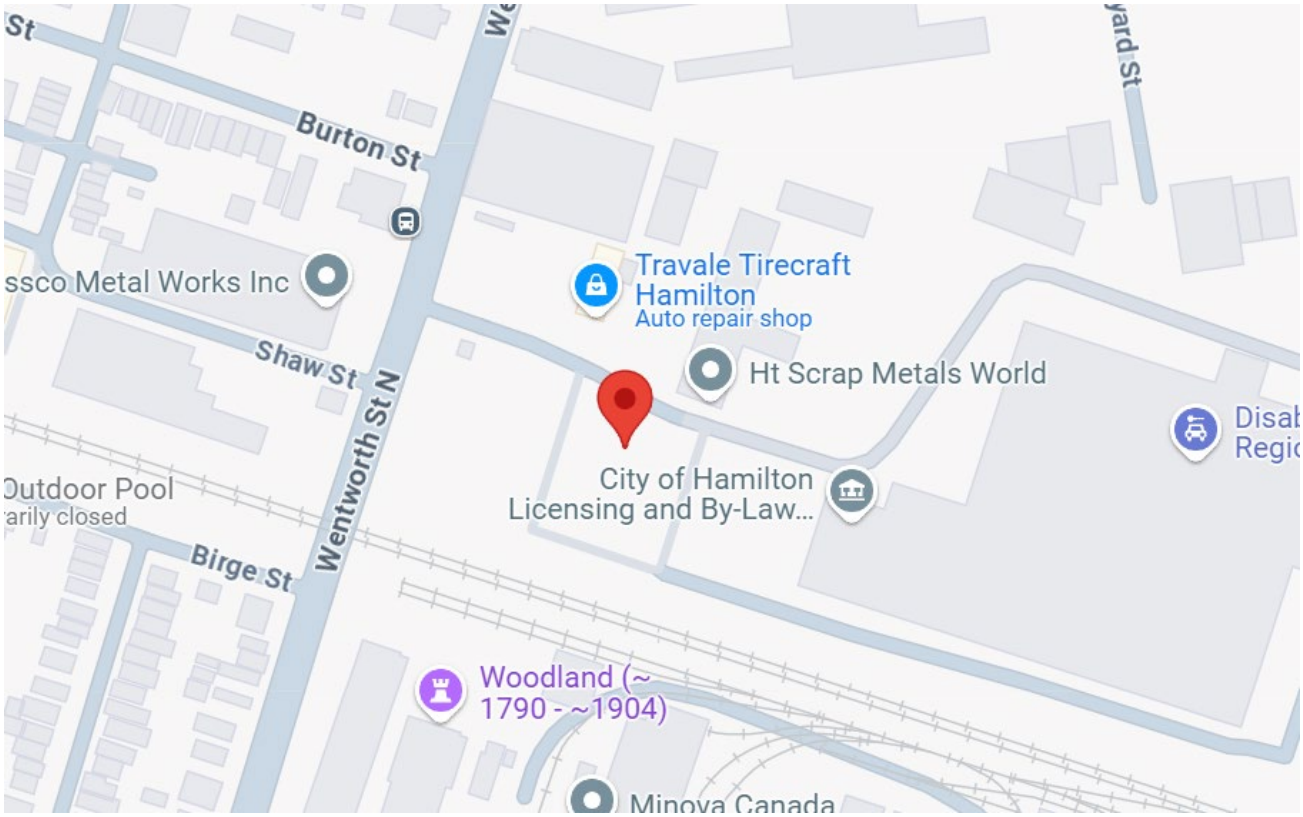
Procurement Manager
City of Hamilton

MAP LOCATION OF 330 Wentworth Street North Hamilton, Ontario L8L 5W2

DISCLAIMER:
The following URL address and map have been provided for illustration purposes only and every effort has been made to ensure accuracy. The City of Hamilton cannot accept any responsibility for errors, omissions, or positional inaccuracy for this information.

Bidders must copy and paste the following URL address into a new web browser:

https://www.google.com/maps/place/330+Wentworth+St+N,+Hamilton,+ON+L8L+5W2/@43.262106,-79.845137,17z/data=!3m1!4b1!4m5!3m4!1s0x882c9bf627f3cbd5:0x87ae8425622f7e1c!8m2!3d43.2621033!4d-79.8433163?entry=ttu&g_ep=EgoyMDI0MTExMy4xIKXMDSoASAFQAw%3D%3D



CITY OF HAMILTON

REQUEST FOR TENDERS

INSTRUCTIONS TO BIDDERS
Revised: October 7, 2022

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INSTRUCTIONS TO BIDDERS

Notice to prospective bidders: The Instructions set out herein define your obligations and limit your rights. Read carefully.

1 Interpretation

In these Instructions to Bidders,

1.1 the provisions shall be read with changes of gender, number or corporate status as the context may require;

1.2 a reference to any Act, by-law, rule, procedure or regulation shall be deemed to include a reference to any substitution or amendment thereof;

1.3 the headings to each section are inserted for convenience of reference only and do not form part of the Request for Tenders;

1.4 any reference to an officer of the City shall be construed to mean the person holding that office from time to time, the designate or deputy of that person, and shall be deemed to include a reference to any person holding a successor office or the designate or deputy of that person.

1.5 unless expressly stated to the contrary, the number of days shall be calculated by,

1.5.1 counting all days including Saturdays, Sundays and public holidays, provided, however, that if the final day of any period shall fall on a Saturday, Sunday or public holiday, then the final day shall be deemed to be the next day which is not a Saturday, Sunday or public holiday;

1.5.2 where “month” is referred to, it shall be a calendar month.

2 Definitions

Capitalized words and phrases used in these Instructions to Bidders, Supplementary Instructions to Bidders, and the Form of Tender shall have the following meanings, unless expressly stated otherwise.

“Addendum” means a written change issued to the Request for Tenders.

“Alternative” means anything for which bidders provide a price in a manner that gives the City options in determining the actual Work of the Contract and may include such items as an optional product, system, installation, method, design and requirement. The City shall not be obliged to purchase an Alternative when accepting a Bid, but may, at its discretion elect to purchase all, some or none of the Alternatives offered.

“Alternative Price” means the amount stipulated by the bidder for an Alternative, which can be stated as an addition, a deduction, or no change to the Base Bid Price. The Successful Bidder shall be obliged to adhere to the Alternative Price quoted in its Bid.

“Base Bid Price” means the amount stated in the Form of Tender by the bidder, for the Work without considering any Alternative or Alternative Price and includes all Provisional Items and Provisional Prices (if any).

“Bid” means a submission made by a bidder in response to the Request for Tenders.

“Bid Security” means the security submitted by a bidder with its Bid which provides financial protection to the City should the Successful Bidder not enter into the Contract or commence the Work following the issuance of a purchase order, and/or not provide the specified security required under the Contract.

“Bidding System” means the electronic system used by the City for the advertisement of public bid opportunities at the following website: https://hamilton.bidsandtenders.ca, and which is required to be used for all dissemination of information by or on behalf of the City and submissions from bidders for this Request for Tenders.

“Business Day” means a day which is not a Saturday, Sunday, public holiday or day when the administrative offices of the City are closed.

“City” means the City of Hamilton, and where an authority or discretion is conferred upon the City under the Request for Tenders, means the appropriate official of the City as designated or appointed under its governing by-laws, resolutions or policies from time to time.

“Contract” means the agreement by formal contract executed by both the City and the Successful Bidder, or by purchase order issued by the City, to perform the Work, including the supply and delivery of all labour, Goods, Services, equipment and incidentals necessary for the proper and satisfactory execution of the Work, and the fulfillment of all other contractual obligations and undertakings, all in accordance with the Request for Tenders, and any written supplementary agreements which form part of the Contract.

“Electronic Bidding” means a method of issuing this Request for Tenders and/or receiving Bids where the process of using and/or receiving Bids by internet is considered appropriate, and in particular includes the Bidding System operated by bids&tenders™ system operated by eSolutions Group, 455 Philip Street, Waterloo, Ontario N2L 3X2.

“Form of Tender” means the City’s forms entitled Form of Tender and Schedule of Prices and any other documents that are supplied as part of the Request for Tenders and which are to be completed and confirmed by the bidder and submitted back to the City in their entirety through the Bidding System.

“Good” means any product of any description required to be installed, supplied or consumed in order to complete the Work.

“Lump Sum Price” means an all inclusive one price that applies to a single item, or specific Service as set out on the Form of Tender.

“Procurement Manager” means the City’s Procurement Manager or his or her delegate or designate.

"Procurement Policy" includes those City procurement policies found at: https://www.hamilton.ca/build-invest-grow/buying-selling-city/bids-and-tenders/procurement-policy-by-law

"Procurement Section Office" means 28 James Street North, 4th Floor, Hamilton, Ontario L8R 1A1.

"Project Manager" means the person designated by the City to administer and oversee the Work.

"Provisional Item" means work or a portion of work the City may wish to have performed but which may be removed, at no additional cost to the City from the scope of the Work at any time. Where such item is removed, the City will deduct the relevant Provisional Price from the Base Bid Price after the award of the Contract.

"Provisional Price" means the amount stipulated by the bidder for a Provisional Item which is to be included in the Base Bid Price.

"Request for Tenders" means all of the following documents, and in the event of a conflict between them, each shall enjoy priority against the others (subject to any express term or condition to the contrary) in accordance with the following successive order:

(a) any Addendum;

(b) any Supplementary General Conditions or Supplementary Conditions;

(c) the General Conditions;

(d) the Specifications, with any Supplementary Specifications (if any) taking priority over the standard Specifications;

(e) any contract drawings;

(f) the Supplementary Instructions to Bidders

(g) these Instructions to Bidders;

(h) the standard form text of the Form of Tender as prescribed by the City;

(i) the sample Contract;

(j) any other documents that form a part of the Request for Tenders.

"Service" means a service of any description required in order to complete the Work, whether commercial, industrial, trade or otherwise, and includes all professional, technical and artistic service, and the transporting, acquiring, supplying, storing and otherwise dealing in a Good.

"Specifications**"** means all written or printed requirements and standards forming part of the Request for Tenders and pertaining to the method and the manner of performing the Work or Service, to the scope of Work and to the quality of a Good to be furnished under the Contract.

"Stipulated Price" means a single, all inclusive, one price that applies to all of the Work.

"Successful Bidder" means the bidder to whom the City has awarded the Contract.

"Tender Coordinator" means the single point of contact for the Request for Tenders and will be the person named on the Communications page of the Request for Tenders.

"Tender Notice" means the public notification of the Request for Tenders.

"Total Contract Price" has the same meaning as Base Bid Price.

"Unit Price" means any component price as set out on the Form of Tender.

"Value Added Taxes" means such sum as shall be levied upon the Base Bid Price by the Federal or Provincial or Territorial Government and is computed as a percentage of the Base Bid 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 bidder by the tax legislation.

"Work" means the whole of the work, the supply and delivery of a Good, the delivery and performance of any Services, the total construction and related services, material, matters and things required to be completed, supplied, mentioned or referred to in performing or executing the work in full in accordance with the requirements set out in the Request for Tenders.

3 Guidelines Regarding Bid Irregularities

As a guide to the bidder, but without qualifying any rights and privileges reserved to the City, the bidders guidelines set out below is indicative of the manner in which discretion reserved by the City is to be exercised with respect to non-compliant Bids. However, the City shall not be liable to any bidder or other person where it elects to exercise a discretion, reserved privilege or right in a manner different from that indicated below. An irregularity that goes beyond the scope of the bidders Guidelines set out below shall be considered by the Procurement Manager.

BIDDERS GUIDELINES		
IRREGULARITY		**RESPONSE**
1.	Qualified or conditional Bid (A Bid restricted by a statement added to the Form of Tender or a covering letter or alterations to the Form of Tender).	Automatic rejection unless the Request for Tenders specifically permit such qualification or condition.

BIDDERS GUIDELINES		
IRREGULARITY		**RESPONSE**
2.	A Bid received in a format not specified in the Request for Tenders such as hardcopy submission, fax, email, etc.	Automatic rejection.
3.	A Bid received on documents other than those original documents supplied by the Bidding System.	Automatic rejection.
4.	Bid Security: Amount of Bid Security provided by bidder is insufficient, does not name correct Municipality as obligee, or no Bid Security is provided or is not otherwise in compliance with the Request for Tenders requirements.	Automatic rejection.
5.	Execution of Bid bond: Corporate seal or electronic signature of bidder, or both, are missing. Corporate seal or electronic signature of bonding company, or both, are missing.	Automatic rejection. Automatic rejection.
6.	Digital bid bond not provided or not an electronically verifiable and enforceable e-Bond.	Automatic rejection.
7.	Other irregularities.	An irregularity that goes beyond the scope of the Bidders Guidelines may be considered by the Procurement Manager.

4 Bid Submission and Form of Tender

4.1 Every Bid **shall**

4.1.1 be submitted on the City's prescribed Form of Tender in its entirety;

4.1.2 be completed in English;

4.1.3 have all of the required blank spaces provided on the Form of Tender completed by the bidder;

4.1.4 include all material, Goods, Services, equipment and labour, required to complete the Work; and

4.1.5 state all prices in Canadian funds, unless otherwise stipulated.

4.2 Electronic Bid submissions only, shall be accepted and received by the Bidding System, on or before the closing date and time stated in the Request for Tenders. A Bid submitted by mail, in person, fax, e-mail or other electronic means, other than through the Bidding System, will not be accepted.

4.3 Bidders shall have a Bidding System vendor account and must be registered as a plan taker for this Request for Tenders. Only plan takers will have access to download this Request for Tenders document, receive Addendum email notifications, download Addendum and to submit their Bid electronically through the Bidding System.

If a bidder has obtained the Request for Tenders document from a third party, the onus is on the bidder to create a Bidding System vendor account and register as a plan taker for the bid opportunity.

4.4 Time is of the essence with respect to the submission of a Bid. It is the **sole** responsibility of each bidder to ensure that its Bid is received by the Bidding System on or before the closing date and time stated in the Request for Tenders document. The closing time shall be determined by the Bidding System web clock.

Bidders are advised that the timing of their Bid submission is based on when the Bid is RECEIVED by the Bidding System, not when a Bid is submitted by a bidder, as Bid transmission can be delayed in an "internet traffic jam" due to file transfer size, transmission speed, etc.

Bidders shall allow sufficient time to upload their Bid submission, including any attachments. Late Bid submission shall not be accepted by the Bidding System.

4.5 The Bidding System will send a confirmation email to the bidder advising that their Bid was submitted successfully. If an email confirmation is not received, contact technical support at bids&tenders™ via email: support@bidsandtenders.ca or by telephone 1-800-594-4798.

4.6 It is the exclusive responsibility of each bidder to submit a complete Bid in accordance with the Request for Tenders.

4.7 All documents prepared and work carried out by a bidder in preparing a Bid, and all oral presentations to the City in connection with a Bid, shall be without cost to the City, and neither the City's publication of a Request for Tenders nor the submission of a Bid shall be construed to oblige the City to award a Contract.

4.8 All words and phrases forming part of a Bid should be written out in full, and abbreviations should not be used.

4.9 No amendment may be made to a Bid after it has been submitted, except in the circumstances set out in Article 6.4 of these Instructions to Bidders.

5 Bid Security

5.1 Each bidder shall submit with its Bid a Bid Security in the form of a digital bid bond in an electronically verifiable and enforceable (e-Bond) format in the amount set out in the Supplementary Instructions to Bidders.

For additional information regarding e-Bonds, bidders should contact their surety company or visit the Surety Association of Canada website.

5.2 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.

5.3 Bidders shall upload their Bid Security to the Bidding System, in the bid submission file labelled “Bid Bond”. All instructions and details for assessing authentication shall be included with the digital bond uploaded in the Bidding System.

5.4 A Bid Security shall, include such terms, be in a form, be executed appropriately and be provided by an issuer authorized to do business in the Province of Ontario, satisfactory to the City in its reasonable discretion.

5.5 When a Bid is accepted by the City, the Successful Bidder will enter into a Contract for the performance of the Work. The Successful Bidder will commence the Work, following the issuance of a purchase order or notice to proceed, and will give the specified security required under the Request for Tenders and the Contract within 10 Business Days of request by the City.

5.6 The digital bid bond will not be returned to the bidder.

5.7 The term of the Bid Security shall be for a minimum period of 90 days after the closing date of the Request for Tenders. Where the irrevocability period for a Bid is extended in accordance with Article 10.2 of these Instructions to Bidder, the bidder shall also ensure that the term of the Bid Security is extended for the same period of time as the irrevocability period.

5.8 A Bid submitted without the required Bid Security will be rejected by the City.

5.9 Each bidder that submits a Bid will be deemed to have acknowledged and agreed that the amount of the Bid Security required with respect to a Bid constitutes a genuine pre-estimate on the part of the City of the damages that will be suffered by the City as a result of a failure or refusal on the part of the Successful Bidder to enter into a Contract, to commence the Work following the issue of a purchase order or notice to proceed, and/or to give the specified security required under the Request for Tenders and the Contract.

5.10 In the event of a failure or refusal on the part of the Successful Bidder to enter into the Contract, to commence the Work following the issue of a purchase order or notice to proceed, and/or to give the specified security required under the Request for Tenders and the Contract, the City shall declare the Bid Security forfeited and the Successful Bidder may be held responsible at the City’s discretion for any increased costs or damages incurred by the City over and above the amount of that Bid Security.

5.11 In addition to the Reserved Privileges of the City set out at Article 16 of the Instructions to Bidders, the City may at its discretion, in the event of a failure, refusal or default on the part of the Bidder to enter into the Contract, to commence the Work

following the issue of a purchase order or notice to proceed, and/or to give the specified security required under the Request for Tenders and the Contract, annul the award or terminate the Contract, accept the next lowest compliant Bid, advertise for new tenders, or carry out the Work in any manner deemed in the best interests of the City. In such a case, if required by the City, the bidder shall pay the City the difference between the Base Bid Price and any greater sum that the City may be obligated to pay by reason of the failure, refusal or default of that bidder, including the cost of any advertisement for new tenders.

6 Addenda and Clarification of the Request for Tenders

6.1 The City reserves the right at any time prior to the award of the Contract,

6.1.1 to withdraw or cancel the Request for Tenders;

6.1.2 to extend the time for the submission of Bids; or

6.1.3 to modify the Request for Tenders,

by the publication of an Addendum, which shall become part of the Request for Tenders, and the City shall not be liable for any expense, cost, loss or damage incurred or suffered by any bidder (or any other person) as a result of its so doing.

6.2 Without limiting the City's right, Article 6.1 may apply to situations where no Bid is compliant or an insufficient number of bids have been received.

6.3 Any Addendum shall be posted on the following website and is sufficiently served upon any prospective bidder if so posted.

https://hamilton.bidsandtenders.ca

6.3.1 In addition to the above method of posting, the City may also notify prospective bidders of any Addendum by any other method it deems appropriate, including email, telephone, fax, courier, hand-delivery or by personal delivery. The need for additional notification and the method(s) to be used shall be in the absolute discretion of the City and notification shall be to the co-ordinates provided by the bidder to the City at the time it obtained the Request for Tenders from the City.

6.3.2 It is the sole responsibility of each bidder to check the website and ensure that it has received any and all Addenda issued by the City. Bidders shall confirm in the Form of Tender that they have received, examined and provided for all Addenda issued under the Request for Tenders. Bidders may in writing, seek confirmation of the number of Addenda issued under the Request for Tenders from the Tender Coordinator.

6.4 Where a bidder submits their Bid prior to the Request for Tenders closing date and time and an Addendum has been issued by the City, the Bidding System automatically **WITHDRAWS** the bidder's Bid submission and changes the Bid submission to an **INCOMPLETE STATUS** (**NOT accepted by the City**). The

withdrawn Bid can be viewed by the bidder in the "**MY BIDS**" section of the Bidding System. The bidder is solely responsible to:

6.4.1 make any required adjustments to their Bid;

6.4.2 acknowledge all Addenda that have been issued for this Request for Tenders; and

6.4.3 ensure the re-submitted Bid is **RECEIVED** by the Bidding System before the closing date and time stated in the Request for Tenders.

6.5 All communication between a bidder and the City (including requests for information or clarification) **shall** be set down in writing and directed to the Tender Coordinator named in the Communications page.

6.6 Any request directed to the City with respect to Article 6.5 prior to the closing date of the Request for Tenders must allow sufficient time for a written response or clarification to be issued by the City prior to the closing date, should the City consider it necessary to issue such response or clarification.

6.7 A written response or clarification of substance shall be shared with each bidder and issued in the form of an Addendum.

6.8 The City shall not be bound by any oral:

6.8.1 instruction;

6.8.2 amendment or clarification of the Request for Tenders;

6.8.3 information; or

6.8.4 advice or suggestion,

provided by any member of the City's staff or consultant to the City concerning the Request for Tenders or the manner in which the Work is to be carried out and the bidder bears any and all risk in relying on such representation.

6.9 Bidders shall acknowledge receipt of any Addenda when submitting their Bid through the Bidding System. Bidders shall check a box for all Addenda and any applicable attachments that have been issued before a bidder can re-submit their Bid submission online.

7 Bidder Responsibilities

7.1 The Contract shall only be between the City and the Successful Bidder. Neither the City nor its consultant shall be construed to have any contractual relationship with the Successful Bidder's employees, subcontractors or material suppliers, or their respective employees or suppliers.

7.2 Each bidder shall be responsible for:

7.2.1 ensuring that it has conducted a thorough inspection of the site, has investigated and examined the Request for Tenders and any other document made available to the bidder by the City and has delivered to the City any request for information in respect of all questions arising out of the foregoing inspections, investigations and examinations in respect to the site;

7.2.2 reviewing all drawings, reports, tests and other documents with respect to site, subsurface or otherwise concealed physical conditions which have been provided or made available to the bidder by the City in relation to the Request for Tenders and shall be responsible for any site, subsurface or otherwise concealed physical condition set out in or inferable from any such report; and

7.2.3 ensuring that they have conducted a sufficient and appropriate scope of inquiry into the manner, method(s) and magnitude of the work that is proposed in the Request for Tenders such that they have established a clear and full understanding of the work being undertaken and are able to fully appreciate the consequences of that work in preparing their Bid.

7.3 The cost of any Work which results from encountering any condition that is described in or properly inferable from the information referred to in Article 7.2 above shall be included in the bidder's Base Bid Price.

8 Opening of Bids

There is no public opening for this Request for Tenders. All Bids shall be electronically opened and posted on the Bidding System, https://hamilton.bidsandtenders.ca, following the closing date and time of the Request for Tenders. The name of the bidder and the Base Bid Price shall be posted for each Bid received.

9 Review of Bids & Bid Verification

9.1 Following the electronic opening, each apparently eligible Bid will be examined by the Procurement Manager to confirm that they are compliant and otherwise complete.

9.2 Unless expressly stated otherwise, the City shall apply a standard of substantial compliance against each Bid.

9.3 The City is not obliged to seek verification of any aspect of a Bid, however, the City may, if it determines that it is appropriate to do so under the circumstances, verify any aspect of any Bid received, at any time, in order to resolve an ambiguity in either the language used or any other vague or uncertain aspect of the Bid.

9.4 Such verification shall not alter the Bid, constitute negotiation or re-negotiation of the price or any other aspect of the Bid, and all correspondence with a bidder for the purposes of such verification shall be conducted through the Procurement Manager.

9.5 The review or verification of a Bid with a bidder shall not oblige the City to enter into a Contract with a particular bidder, nor shall it constitute an acceptance of a Bid.

9.6 All verification under this section shall form part of the Bid, be in writing, and be in a form satisfactory to the City.

10 Acceptance & Irrevocability of Bid

10.1 A Bid shall be irrevocable and open for acceptance by the City of Hamilton for a period of 90 days following the closing date and time of the Request for Tenders.

10.2 Where the City is unable to award a Contract prior to the expiry of the irrevocability period, the City may, on or prior to that expiry date, make a request to each of the compliant bidders to confirm, in writing, their willingness to hold their Bid prices, extend the term of their Bid Security and extend the irrevocability period for the specific period of time requested by the City.

11 Award of Contract

11.1 The City shall notify the Successful Bidder as soon as practicable after the award of the Contract. Despite any requirement for the formal execution of a Contract, the Contract shall be deemed to arise upon the award of the Contract to the Successful Bidder.

11.2 Where a Request for Tenders is awarded to a bidder in respect of the Work and in accordance with the provisions of the Request for Tenders and Bid, the bidder shall be required to either:

11.2.1 execute a Contract on the form set out in the Request for Tenders and approved by the City's Legal Services Division; or

11.2.2 where the form of Contract in Article 11.2.1 is not required they shall be assigned a contract number and the Request for Tenders and the Bid shall become the Contract in respect of the Work.

11.3 The award letter will identify documents required by the City prior to being able to issue a purchase order, the timeline for providing those documents to the City and the name of the Project Manager who will coordinate the start date for the Work.

11.4 The Base Bid Price for each compliant Bid received as well as the Contract award information may be obtained from the following website:

https://hamilton.bidsandtenders.ca

12 Conflict of Interest, Lobbying and Collusion

12.1 The City may reject any Bid submitted where a bidder is in contravention of the City's Procurement Policy with respect to conflict of interest.

12.2 Other than as expressly permitted or required in the Request for Tenders a bidder and their representative shall not, with respect to the Request for Tenders or the Work, make any public comment, respond to questions in a public forum, or carry out any activities to publicly promote or advertise their qualifications, their Bid, or their interest in this competitive procurement process.

12.3 For greater certainty, a bidder shall not communicate with the City regarding this procurement except through the Tender Coordinator identified on the Communications page of the Request for Tenders who shall be the City's single point of contact for the bidder during this process.

12.4 The bidder acknowledges that this Bid is made without any connection, comparison of figures or arrangements with, or knowledge of, any other person making a Bid for the same work and is in all respects fair and without collusion or fraud.

13 Confidentiality

13.1 A bidder should be aware that all information submitted is being collected under authority of the Municipal Act, 2001, and may be used in the City's review of Bids and in the Contract that is entered into with the Successful Bidder. In this regard, the bidder should be aware that:

13.1.1 the bidder's name and Base Bid Price at a minimum will be made public. In addition, certain contractual information must be disclosed to Council and accordingly may become part of the public record; and

13.1.2 all correspondence, documentation and information provided by a bidder to the City as part of a Bid may be reproduced for the purposes of reviewing the bidder's Bid and/or for the purposes of an audit of the procurement process.

13.2 All such information is also subject to collection in accordance with the Municipal Freedom of Information and Protection of Privacy Act ("MFIPPA") and Personal Health Information Protection Act ("PHIPA") and City policies and procedures related to the collection and administration of such records. For greater particularity and direction regarding how such issues of confidentiality will be handled and may affect a bidder's rights, the bidder should reference the City's policies related to Freedom of Information on the City's website under the Office of the City Clerk at hamilton.ca. In preparing the Bid, the bidder should note the following:

13.2.1 a bidder may mark as confidential any scientific, technical, commercial, proprietary or similar confidential information contained in its Bid, the disclosure of which could cause it injury, excluding the Base Bid Price and its name. A bidder shall not identify the whole of a Bid as confidential. A

watermark or rubber stamp imprint is suitable to identify confidential parts of a Bid.

13.3 All correspondence, documentation and information provided by the City, its employees, agents or representatives to any bidder in connection with, or arising out of the Request for Tenders remains the property of the City and must not be used for any purpose other than for replying to the Request for Tenders. Confidentiality of records and information of the City relating to the Work described in the Request for Tenders must be maintained at all times. If any proprietary or confidential information belonging to, or in the care of, the City is disclosed to any bidder by the City's employees, agents, representatives and independent contractors, or any other person at the request of the City in connection with the Request for Tenders, the bidder shall:

13.3.1 safeguard all such information;

13.3.2 maintain in strict confidence and not reproduce or disclose any such information to any person except as required by law or as expressly permitted in advance by the City in writing;

13.3.3 return forthwith all such information as may be in documentary form or recorded electronically by the closing date and time; and

13.3.4 not use any such information for any purpose other than the purpose for which it was provided by the City or by any other person at the request of the City.

14 Withdrawal of Bids by Bidder

14.1 Withdrawal of a Bid after it has been submitted and received by the Bidding System, is permitted only prior to the closing date and time of the Request for Tenders.

14.2 Requests made after the closing date and time of the Request for Tenders to withdraw a Bid received by the Bidding System will be disregarded.

14.3 A Bid withdrawn prior to the closing date and time of the Request for Tenders may be revised and re-submitted at any time prior to that closing date and time. Bidders are solely responsible to ensure:

14.3.1 any required revisions are made to their Bid;

14.3.2 acknowledge all Addenda that have been issued for this Request for Tenders; and

14.3.3 ensure the re-submitted Bid is received by the Bidding System prior to the closing date and time of the Request for Tenders.

15 Price

15.1 No variation in Bid price(s) shall be permitted after the closing date and time of the Request for Tenders except where the City corrects an obvious computational or other mathematical error evident on the face of the Bid. Only extensions, subtotals and totals shall be corrected. No modification to individual prices, either Unit Price or Lump Sum Price, shall be made by the City.

15.2 Where the bidder is instructed to price the Work on a Stipulated Price basis only, no corrections to the Base Bid Price shall be made by the City.

15.3 The Base Bid Price must be quoted on an all-in basis and include the provision and delivery of all necessary labour, Goods, materials, warranty and maintenance requirements, Services, tools, equipment, supplies, utilities, levies and duties and other incidentals, and for performing all the Work and providing all Services contemplated under the Contract.

15.4 The Base Bid Price and all other prices quoted on the Form of Tender shall be exclusive of Value Added Taxes. All other taxes shall be included in the prices submitted for this Request for Tenders.

Where there is a variation due solely to an increase or decrease in the rate of applicable Value Added Tax from a Canadian taxing authority, beyond the control of the Successful Bidder, occurring after the time and date of submission of its Bid, the variation shall alter the price of the Bid only to the extent of the Value Added Tax increase or decrease. The Successful Bidder must prove to the satisfaction of the City that the Successful Bidder will not benefit in any way by reason of any increase to the Base Bid Price.

15.5 As various parts of the Work may or may not be exempt from Value Added Taxes, the bidder is required to refer to the Supplementary Instructions to Bidders for details, if any, respecting payment exemptions, rebates and Value Added Taxes.

16 Reserved Privileges of the City

The City shall have the following reserved privileges, which may be exercised or waived in its absolute discretion.

16.1 The City may reject a Bid on the following basis:

16.1.1 the City may reject any Bid, the lowest Bid or all Bids, may cancel the Request for Tenders or may cancel the Request for Tenders and require the submission of new Bids;

16.1.2 any extraordinary or unjustified disparity between the lowest Bid and the other Bids received by the City;

16.1.3 the need to avoid the use of unproven technology and methodologies;

16.1.4 the prior record of the bidder as a contractor to the City;

16.1.5 a Bid submitted by a person which in the opinion of the City or its professional advisors, does not possess the experience, or financial, technical, personnel or other resources that may reasonably be expected to be necessary in order to carry out the obligations that the bidder proposes to assume under the terms of its Bid.

16.2 Where the Contract is awarded to the lowest compliant bidder, the City may negotiate amendments to the Contract or to the Work to be done or Services or materials to be supplied under the Contract.

16.3 Where none of the Bids are compliant and in the opinion of the City it is impractical to reissue a new Request for Tenders, the City will reject all of the Bids and may permit Bids to be submitted without issuing a new Request for Tenders.

16.4 Where the Base Bid Price for the lowest compliant Bid received substantially exceeds the estimated procurement cost of the Work, the City may negotiate with the lowest compliant bidder for a reduction to the Base Bid Price.

16.5 The City maintains the right to verify any information provided or contained in any Bid.

16.6 The City reserves the ability to exercise the rights, privileges and authority contained in the Procurement Policy and procedures thereunder with respect to the Request for Tenders.

17 Notice to Proceed and Start Date

17.1 The City may issue a written notice to proceed to the Successful Bidder prior to the execution of any required Contract.

17.2 Work shall commence on the start date specified in the notice to proceed, unless otherwise agreed by the Successful Bidder and the City.

18 Applicable Law and Limit on Liability

18.1 The City shall not be liable, in any way, to the bidder for any delays, or costs associated with delays, in the Request for Tenders process.

18.2 The bidder agrees that,

18.2.1 any action or proceeding relating to the Request for Tenders process shall be brought in an Ontario court of competent jurisdiction and any such action or proceeding shall be issued at the Hamilton, Ontario office of that Court and for that purpose each party irrevocably and unconditionally attorns and submits to the jurisdiction of that Ontario court at Hamilton, Ontario;

18.2.2 it irrevocably waives any right to and will not oppose any Ontario action or proceeding relating to the Request for Tenders process on any jurisdictional basis, including forum non conveniens; and

18.2.3 it will not oppose, in any other jurisdiction, the enforcement against it of any judgment or order duly obtained from an Ontario court in Hamilton, Ontario as set out above.

18.3 If a bidder is required by applicable law to hold or obtain a licence, permit, consent or authorization to carry on an activity contemplated in its Bid, neither acceptance of the Bid nor execution of the Contract shall be considered to be approval by the City of carrying on such activity without the requisite licence, permit, consent or authorization.

18.4 The bidder agrees that if the City commits a material breach of the Request for Tenders (that is, a material breach of Contract A), the City's liability to the bidder and the aggregate amount of damages recoverable against the City for any matter relating to or arising from that material breach, whether based upon an action or claim in contract, warranty, equity, negligence, intended conduct or otherwise, including any action or claim arising from the acts or omissions, negligent or otherwise, of the City, shall be no greater than the Bid preparation costs that the bidder seeking damages from the City can demonstrate.

19 Accommodations for Bidders with Disabilities

19.1 In accordance with the Ontario Human Rights Code, Ontarians with Disabilities Act, 2001 (ODA) and Accessibility for Ontarians with Disabilities Act, 2005 (AODA), the City of Hamilton will accommodate for a disability, ensuring full and equitable participation throughout the bid process.

19.2 If a bidder requires this Request for Tenders in a different format to accommodate a disability, the bidder must contact the Tender Coordinator as soon as possible and in any event prior to the closing date. The Request for Tenders in the different format will be issued only to the requesting bidder and all Addenda will be issued in such different format only to the requesting bidder.

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

Revised: January 25, 2023

1. OPTIONAL SITE MEETING

There is an optional site meeting scheduled.

Location: 330 Wentworth Street North Hamilton, Ontario L8L 5W2. (see location map attached)
Date: Thursday, February 6,2025
Time: 10:00 AM, Hamilton time

All attendees are required to wear CSA approved hard hats and safety boots. If an attendee does not have the required personal protection equipment, they may not be allowed to attend the site meeting.

2. TAXES

There are no supplementary instructions regarding Value Added Taxes.

3. BID SECURITY

Bidders shall submit a Bid Security in accordance with Article 5 Bid Security of the Instructions to Bidders in the amount of not less than **($37,000.00)**.

4. JOINT VENTURES

For greater certainty, a Bid must be submitted by a single entity as the Bidder. The City will not accept a Bid from a collection of entities jointly submitting as the Bidder. The single entity submitting the Bid must not be a special purpose company incorporated solely for the purpose of entering into a Contract with the City regarding the Work. The Bidder shall be expected to perform the Work either through itself, or through itself and any subcontractors.

5. RECORD AND REPUTATION

See the City of Hamilton Procurement Policy for specific requirements and obligations at: https://www.hamilton.ca/build-invest-grow/buying-selling-city/bids-and-tenders/procurement-policy-by-law

7. AWARD OF CONTRACT

Subject to the Reserved Privileges of the City set out in Article 16 of the Instructions to Bidders, the Contract shall be awarded to the compliant Bid with the lowest Base Bid Price.

8. SPECIFIED PRODUCTS OR SERVICES

Specified product or service by name, trade or company is regarded as the standard of quality required by the Specifications. **No alternates or substitutes will be considered prior to the award of the Contract**. After the award of the Contract, should the Successful Bidder want the City to approve an alternate or substitute for a specified product or service, the Successful Bidder shall make such request in writing to the City, which the City may consider, in its sole discretion. No alternate nor substitution for a specified product or service required by the Specifications shall be made by the Successful Bidder without the prior written approval of the City.

13. PROPOSED TIMELINES

Event	Date
Anticipated award date	Approximately 4 weeks from closing date.
Commencement of Work	Approximately 4 weeks from award date.

16. POLICIES, REGULATIONS AND GUIDELINES

The Successful Bidder shall be aware of and adhere to all of the applicable City Policies and Legislation set out on the City of Hamilton website at: https://www.hamilton.ca/build-invest-grow/buying-selling-city/bids-and-tenders/procurement-policy-by-law

17. DECLARATION OF BIDDER COMPLIANCE WITH CITY BY-LAWS

Should the Bidder's declaration in its Form of Tender that it is in compliance with all City of Hamilton by-laws be untrue or incorrect, the City shall be entitled at its sole discretion to reject their Bid.

LUMP SUM BREAKDOWN OF BASE BID PRICE

Revised: December 2, 2011

Contract Number: C13-13-25

LOCATION: 330 Wentworth St N, Hamilton, ON L8L 5W2

DESCRIPTION: Supply and install a domestic hot water (DHW) solar thermal systems and unit heaters upgrade.

After opening of the Bids, the two apparent low bidders are required to submit to the City, within two Business Days of the closing date of the Request for Tenders, the breakdown of their Base Bid Price. The breakdown shall be given according to the following Lump Sum Breakdown. The City may refuse to accept any breakdown, which contains prices considered to be unbalanced and request the bidder to adjust the breakdown to correct such unbalancing, and by submitting its Bid, the bidder agrees to do so upon such request by the City.

SUMMARY

SECTION "1"	Pre-Construction Items	TOTAL	$
SECTION "2"	Construction Items	TOTAL	$
SECTION "3"	Commissioning, Training and Submittals	TOTAL	$
		BASE BID PRICE	$

CONTRACT NO. C13-13-25

LUMP SUM BREAKDOWN OF BASE BID PRICE

SECTION "1" - Pre-Construction Items

LOCATION: 330 Wentworth St N, Hamilton, ON L8L 5W2
DESCRIPTION: Supply and install a domestic hot water (DHW) solar thermal systems and unit heaters upgrade.

ITEM NO.	DESCRIPTION	LUMP SUM PRICES
1.1	Bonding	$
1.2	Insurance	$
1.3	Site Investigation with Plant Operations (includes preconstruction safety review and ***mandatory site meeting with all suppliers and subcontractors***)	$
1.4	Shop Drawings	$
1.5	Mobilization/Demobilization	$
1.6	Construction Sign	$
	Total of Section "1"	$ _____
	(Carry to **Summary** on **Lump Sum Breakdown of Base Bid Price**)	

CONTRACT NO. C13-13-25

LUMP SUM BREAKDOWN OF BASE BID PRICE

SECTION "2" - Construction Items

LOCATION: 330 Wentworth St N, Hamilton, ON L8L 5W2

DESCRIPTION: Supply and install a domestic hot water (DHW) solar thermal systems and unit heaters upgrade.

ITEM NO.	DESCRIPTION	EST'D QTY.	UNIT PRICE	TOTAL PRICE
2.1	Removal of all existing natural gas unit heaters as per Specifications.	70		
2.2	Supply and install twenty-eight (28) natural gas fired heaters as per Specifications.	28		
2.3	Supply and install eleven (11) electric heaters as per Specifications.	11		
2.4	Supply and install three (3) new solar thermal Domestic Hot Water (DHW) systems as per Specifications.	3		

Total of Section "2" $ _____

(Carry to **Summary** on **Lump Sum Breakdown of Base Bid Price**)

l.m. - linear metre
sq. m. - square metre
ea. - each

CONTRACT NO. C13-13-25

LUMP SUM BREAKDOWN OF BASE BID PRICE

SECTION "3"- Commissioning, Training and Submittals

LOCATION: 330 Wentworth St N, Hamilton, ON L8L 5W2

DESCRIPTION: Supply and Install a Domestic Hot Water (DHW) Solar Thermal Systems and Unit Heaters Upgrade.

Section 3 shall provide for all items, equipment, services, testing, inspections, labour, energy, electrical power, fuel, security watchmen, reports, attendance of suppliers, sub-contractors, testing companies, consulting services contracted by the contractor, and any other requirements to complete the commissioning of all items required by this Contract to the satisfaction of the City, including any additional return visits, labour and materials; shall provide for training of City staff and its facilities operators; and shall provide for five complete sets of all required as-builts, Operation and Maintenance Manuals, reports, information literature and any other required submittals.

ITEM NO.	DESCRIPTION	LUMP SUM PRICES
3.1	Commissioning	$
3.2	Training	$
3.3	Submittals	$
	Total of Section "3"	**$** _____
	(Carry to **Summary** on **Lump Sum Breakdown of Base Bid Price**)	

CCDC 2 - 2020
STIPULATED PRICE CONTRACT

A copy of the CCDC 2 – 2020 Stipulated Price Contract is not being reproduced for this RFT and the English version can be purchased at:

https://www.ccdc.org/documents/

Supplementary Conditions to Contract CCDC 2-2020
Dated: June 20, 2023

SC 1. GENERAL

These Supplementary Conditions presuppose the use of the Standard Construction Document CCDC 2-2020 Stipulated Price Contract, English version. These "Supplementary Conditions" void, supersede or amend the "Agreement", "Definitions" and "General Conditions" as hereinafter provided, as the case may be.

Where a Definition, a General Condition or paragraph of the Agreement or a General Conditions of the Stipulated Price Contract is deleted by these Supplementary Conditions, the numbering of the remaining Agreement, Definitions, General Conditions or paragraphs shall remain unchanged, and the numbering of the deleted item will be retained, unused, unless noted otherwise.

SC 2. AGREEMENT

1. Delete the words "*Ready-for-Takeover"* from paragraph 1.3 Article A-1 THE WORK and replace with "*Substantial Performance Date".*

2. Add new paragraph 1.4 to Article A-1 THE WORK, as follows:

   "1.4 Provide all the labour, material, equipment, machinery, *Products* and work including, without limitation, all *Commissioning* services required by the *Contract Documents* in order to fully complete and construct the *Work* and in accordance with, and satisfaction of all *Applicable Laws* including, without limitation, those relating to occupational health and safety and any and all obligations, responsibilities and duties required by or set in any site plan agreement or approval, attributable to the *Place of the Work* and/or the proposed development therein, and furnish efficient business and construction administration and superintendence consistent with the interests of the *Owner*."

3. Add documents to the existing list of *Contract Documents* in paragraph 3.1 of Article A-3 CONTRACT DOCUMENTS as follows:

- Addenda, as issued
- the Special Provisions
- *Project* specific Supplementary Conditions to Contract CCDC 2-2020
- Supplementary Conditions to Contract CCDC 2-2020
- the *Form of Tender* as approved and accepted by the *Owner*
- detailed *Contract Price* Breakdown or Lump Sum Breakdown of Base Bid Price
- the *Specifications*
- *Drawings*

4. Delete subparagraph 5.2.1 from Article A-5 PAYMENT in its entirety and replace with the following:

"5.2.1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by arbitration or court, interest at the rate prescribed by the Construction Act (Ontario) on such unpaid amounts shall also become due and payable until payment. Such interest shall be compounded on a monthly basis."

5. Add new paragraph 5.3 to Article A-5 PAYMENT as follows:

"5.3 In the event of loss or damage occurring where payment becomes due under the property and boiler insurance policies, payments shall be made to the *Contractor* in accordance with the provisions of GC 11.1 - INSURANCE."

6. Add to the end of paragraph 6.5, the following:

"The only *Notices in Writing* which will be delivered by electronic communication are applications for progress payment, applications for final payment, and notices of non-payment. All other *Notices in Writing* will be delivered by hand, by courier, by prepaid first class mail or by facsimile."

7. Delete Article A-7 LANGUAGE OF THE CONTRACT in its entirety.

8. Add new Article A-9 CONFLICT OF INTEREST as follows:

"ARTICLE A-9 CONFLICT OF INTEREST

9.1 The *Contractor*, all of the *Subcontractors*, and any of their respective advisors, partners, directors, officers, employees, and agents shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the *Owner*) with the provision of the *Work* pursuant to the *Contract*. The *Contractor* acknowledges and agrees that a conflict of interest includes the use of *Confidential Information* where the *Owner* has not specifically authorized such use.

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

9.3 The *Contractor* covenants and agrees that it will not hire or retain the services of any employee or previous employee of the City of Hamilton where to do so constitutes a breach by such employee or previous employee of the *Owner*'s conflict of interest policy, as it may be amended from time to time.

9.4 A breach of this Article or a contravention of the *Owner*'s Procurement Policy, by the *Contractor*, any of the *Subcontractors*, or any of their respective advisors,

partners, directors, officers, employees, agents, and volunteers shall entitle the *Owner* to terminate the *Contract*, in addition to any other rights and remedies that the *Owner* has in the *Contract*, in law, or in equity."

9. Add new Article A-10 CONFIDENTIALITY as follows:

"ARTICLE A-10 CONFIDENTIALITY

10.1 The *Contractor* agrees to ensure that it shall, both during or following the term of the *Contract*, maintain the confidentiality and security of all *Confidential Information* and *Personal Information*, and that it shall not directly or indirectly disclose, destroy, exploit, or use any *Confidential Information* or *Personal Information*, except where required by law, without first obtaining the written consent of the *Owner*. The *Contractor* may disclose any portion of the *Contract Documents* or any other information provided to the *Contractor* by the *Owner* to any *Subcontractor* or *Supplier* if the *Contractor* discloses only such information as is necessary to fulfill the purposes of the *Contract* and the *Contractor* has included a commensurate confidentiality provision in its contract with the *Subcontractor* or *Supplier*. The *Contractor* acknowledges that it will comply with all requirements of the *Personal Information Protection and Electronic Documents Act*. The *Contractor* acknowledges that the *Owner* is bound by the provisions of the *Municipal Freedom of Information and Protection of Privacy Act ("MFIPPA")*. The *Contractor* further acknowledges that the *Owner* may be required to disclose any or all of the *Confidential Information* and *Personal Information* in the event that it is compelled to do so by law, through a request under *MFIPPA*, or by the rules of any applicable regulatory authority."

SC 3. DEFINITIONS

1. Add to the end of Definition *Consultant*, the following:

"The term *Consultant* means the *Consultant* or the *Consultant*'s authorized representative."

2. Add to the end of Definition *Contractor*, the following:

"The term *Contractor* means the *Contractor* or the *Contractor's* authorized representative as designated to the *Owner* in writing."

3. Add to the end of Definition *Owner*, the following:

"The term *Owner* means the *Owner* or the *Owner's* authorized representative as designated to the *Contractor* in writing, but does not include the *Consultant*."

4. Add after "The *Work* means the total construction" in Definition *Work*, the following:

", *Products*, installation, C*ommissioning*, checkout, start-up testing"

5. Delete Definition *Working Day* in its entirety and replace with the following:

"***Working Day*** means a day when the *Owner's* administrative offices are open, and does not include weekends or statutory holidays."

6. Add new Definitions as follows:

"Applicable Laws
Applicable Laws and applicable laws means all public laws, statutes, regulations, transactions, codes, acts, orders, by-laws, rules, judgements, decrees, treaties, *Governmental Consents*, notices, protocols, binding policies and guidelines, and requirements of all *Governmental Authorities*, which now or hereafter, may be applicable to and enforceable against the *Work* or any part thereof, including those relating to employment, zoning, building, life/safety, environment and health, and includes, where appropriate, any interpretation of a rule, statute, regulation, order, decree, treaty or other requirement having the force of law by any person having jurisdiction over it, or charged with its administration or interpretation.

As-Built Drawings
As-Built Drawings means the *Drawings* and *Specifications* revised by the *Contractor* during the *Work*, showing any and all changes or variations to the *Work* from the requirements of the *Drawings* and *Specifications*.

Authorities Having Jurisdiction
The phrase *Authorities Having Jurisdiction* or the term *Authorities* means those authorities having jurisdiction under *Applicable Laws* over the *Work* or parts thereof.

Commission
Commission means and *Commissioning* refers to the procedure which includes checking, balancing, testing, adjusting and measuring *Work* performed by the *Contractor* to demonstrate and verify to the *Owner* and *Consultant*, the satisfactory installation, operation and performance of all components of the *Work* and that the *Project* is ready for use.

Confidential Information
Confidential Information means all the information or material of the *Owner* that is of a proprietary or confidential nature, whether it is identified as proprietary or confidential or not, including but not limited to information and material of every kind and description such as *Drawings* which is communicated to or comes into the possession or control of the *Contractor* at any time, but *Confidential Information* shall not include information that:

(1) is or becomes generally available to the public without fault or breach on the part of the *Contractor*, including without limitation breach of any duty of confidentiality owed by the *Contractor* to the *Owner* or to any third party, but only after that information becomes generally available to the public;
(2) the *Contractor* can demonstrate to have been rightfully obtained by the *Contractor* from a third party who had the right to transfer or disclose it to the *Contractor* free of any obligation of confidence;

(3) the *Contractor* can demonstrate to have been rightfully known to or in the possession of the *Contractor* at the time of disclosure, free of any obligation of confidence; or

(4) is independently developed by the *Contractor* without use of any *Confidential Information*.

Construction Act

The Construction Act, R.S.O. 1990, Chapter C.30 is the legislation covering construction in Ontario and is also referred to throughout the *Contract* as the Payment Legislation.

Construction Costs

Construction Costs means the direct costs of all the elements of the *Work* or a change in the *Work* as the case may be. A cost that can be applied wholly to a particular item of the *Work*, or a change in the *Work*, should be considered part of the *Construction Costs*, excluding all *Value Added Taxes*, *Overhead Costs*, and profit.

Contemplated Change Order

Contemplated Change Order means a standard document issued to the *Contractor* by the *Consultant* on behalf of the *Owner*, requesting that the *Contractor* provide pricing for a change to the scope of the *Work*. Authorization of the *Contemplated Change Order* is formalized by a *Change Order* prior to the *Work* proceeding.

Fair Wage Policy

Fair Wage Policy means the City of Hamilton's Fair Wage Policy and Fair Wage Schedule available on the City of Hamilton's website at: https://www.hamilton.ca/build-invest-grow/buying-selling-city/bids-and-tenders/fair-wage-policy-fair-wage-schedule

Final Completion of the Work

Final Completion of the Work shall have been reached when the *Work* has previously been deemed substantially performed as defined in these *Contract Documents*, and all deficiencies and incomplete *Work* have been completed and certified by the *Consultant*, prior to the release of final holdback monies on the *Project*.

Force Majeure

Force Majeure means a delay in the performance of the services occurring other than as a result of the deliberate act or negligence of either party respectively, and which:

(1) could not have been reasonably foreseen, and

(2) was caused by an event beyond the reasonable control of each party respectively, and

(3) for the sake of greater certainty, shall include any one or more of the following:

- (i) acts of God, His Majesty the King or His enemies;
- (ii) civil war, insurrections or riots;
- (iii) fires, floods, explosions, earthquakes, or serious accidents;
- (iv) unusually severe weather, epidemics, or quarantine restrictions;
- (v) governmental priorities or allocation regulations or orders affecting materials, labour, equipment and facilities;
- (vi) fuel shortages or freight embargoes;

(vii) strikes or labour troubles causing cessation, slowdown, interruption of work or other similar events relating to a person other than the *Contractor* (or any *Subcontractor*) or to the *Owner*.

Financial difficulties experienced by the *Contractor* will not be considered an occurrence of a *Force Majeure* under the *Contract*.

Form of Tender
Form of Tender means the City's forms entitled Form of Tender and Schedule of Prices and any other documents that were supplied as part of the request for tenders/request for proposals for the *Contract*, and were completed and submitted by the *Contractor* back to the *Owner*.

Governmental Authority
Governmental Authority means any federal, provincial, or municipal government and any agency, authority, body, board or commission established by any of them. It includes the police and fire departments.

Governmental Consent
Governmental Consent means any license, right, permit, franchise, privilege, registration, direction, decree, consent, order, permission, approval, or authority to be issued or provided by, or written contract between the *Owner* and a *Governmental Authority*.

Overhead Costs
Overhead Costs means those costs that cannot be attributed to a single task of *Work* and are exclusive of *Construction Costs*, *Value Added Taxes*, and profit. *Overhead Costs* include both general and administrative costs of the *Contractor* or *Subcontractor* together with any and all *Project* specific or office costs of the *Contractor* or *Subcontractor*. Without limiting the generality of the foregoing, *Overhead Costs* include costs associated with general conditions, administration, head office, field office, management, supervision, coordination, scheduling, purchasing, security, health and safety, general labour, accommodation, subsistence, travel, storage, inventory, loading and unloading, computers and electronics, software, printing, general tools and equipment, standby costs and charges, vehicles, engineering, drafting, shop drawings, submittals, surveying, temporary facilities, traffic control, fire safety, sanitation, site clean-up, utilities and services, controls, insurance, bonding, heating, winterization, permits, inspection, regulatory fees, mobilization, demobilization, and other costs of a similar reasonable nature.

Personal Information
Personal Information has the same definition as in subsection 2(1) of *MFIPPA* and includes an individual's name, address, telephone number, and date of birth, whether recorded in printed form, on film, by electronic means, or otherwise and disclosed to the *Contractor*.

Request for Information (RFI)
Request for Information ("RFI") means a standard document typically issued by the *Contractor* to the *Consultant*, requesting a clarification of the scope of *Work* provided in the *Contract Documents*. The response to the RFI typically results in a formal

Supplemental Instruction where there is no modification of the original scope of the *Work*, or a *Contemplated Change Order* from which the *Contractor* may provide pricing for the revision to the original scope of the *Work*.

Substantial Performance Date
Substantial Performance Date means the date by which the *Contractor* shall attain *Substantial Performance of the Work* as specified in Article A-1 – THE WORK.

Statutory Declaration
Statutory Declaration means the form of the statutory declaration to be delivered by the *Contractor* upon applications for progress payment, release of holdback and final payment, being CCDC 9A – 2001 Statutory Declaration (latest edition available)."

SC 4. GC 1.1 CONTRACT DOCUMENTS

1. Delete subparagraph 1.1.4 in its entirety.

2. Delete subparagraph 1.1.5.1 in its entirety and replace with the following:

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

- *Change Orders* and/or *Change Directives*
- the executed Agreement between the *Owner* and the *Contractor*
- detailed *Contract Price* breakdown or Lump Sum Schedule Breakdown
- the *Form of Tender* as approved and accepted by the *Owner*
- Addenda, as issued
- Special Provisions
- *Project* specific Supplementary Conditions
- Supplementary Conditions to Contract CCDC 2-2020
- Definitions
- the General Conditions of the Stipulated Price Contract
- the *Specifications*
- *Drawings"*

3. Delete "and shall remain the *Consultant's* property" from the first sentence of paragraph 1.1.10 and replace with the following:

"are not the *Contractor's* property"

SC 5. GC 1.2 LAW OF THE CONTRACT

1. Add new paragraphs 1.2.2 and 1.2.3 as follows:

"1.2.2 The *Contractor* agrees that:
.1 any action or proceeding relating to the *Contract* shall be brought in a court of competent jurisdiction in the City of Hamilton and for that purpose each party irrevocably and unconditionally attorns and submits to the jurisdiction of that court;

.2 it irrevocably waives any right to and will not oppose any action or proceeding relating to the *Contract* on any jurisdictional basis, including forum non conveniens; and

.3 it will not oppose in any other jurisdiction, the enforcement against it, of any judgment or order duly obtained from a Hamilton court as set out above.

1.2.3 The *Contractor* shall comply with all municipal by-laws as they pertain to the City of Hamilton in respect of the operation of the *Contractor*'s business and the *Work*. Further, the *Contractor* shall, at all times that the *Contract* is in effect and upon request of the *Owner*, provide proof of compliance satisfactory to the *Owner*, at the *Contractor's* own cost. If the *Contractor* fails to do any of the foregoing, the *Contractor* shall be considered to be in default of the *Contract* in accordance with GC7.1.2 and the *Owner* shall be entitled at its sole discretion to terminate the *Contract* and to pursue any other legal recourse the *Owner* deems appropriate."

SC 6. GC 1.3 RIGHTS AND REMEDIES

1. Add to the beginning of paragraph 1.3.2, the following:

"Except with respect to the notice requirements set out in paragraphs 6.4.1, 6.5.4, and 6.6.1,"

2. Add new paragraph 1.3.3 as follows:

"1.3.3 All rights and remedies of the parties for any breach by the other party of its obligations under the *Contract* shall be cumulative and not exclusive or mutually exclusive alternatives, may be exercised singularly, jointly or in combination and shall not be deemed to be in exclusion of any other rights or remedies available to the non-breaching party under the *Contract* or otherwise at law or in equity or by statute."

SC 7. GC 1.4 ASSIGNMENT

1. Delete paragraph 1.4.1 in its entirety and replace with the following:

"1.4.1 The *Contractor* shall not assign the *Contract*, or any portion thereof, without the prior written consent of the *Owner*, which consent may not be unreasonably withheld. The *Owner* shall be entitled to assign the *Contract* to any person or other entity (the "Assignee"). Upon the assumption by the Assignee of the *Owner*'s obligations under the *Contract*, the *Owner* shall be released from its obligations arising under the *Contract*."

2. Add new paragraph 1.4.2 as follows:

"1.4.2 Neither the use of one or more *Subcontractors* to carry out part of the *Work*, nor the assignment of the whole or of any part of the *Contract* or the *Work* to be done under it shall relieve the *Contractor* of its obligations and liability to the *Owner*."

SC 8. GC 1.5 MUNICIPAL CONFLICT OF INTEREST

1. Add new general condition GC 1.5 MUNICIPAL CONFLICT OF INTEREST as follows:

"GC 1.5 MUNICIPAL CONFLICT OF INTEREST

1.5.1 The *Owner* may terminate the *Contract* where the *Contractor* is in contravention with the *Owner*'s Procurement Policy with respect to conflict of interest."

SC 9. GC 1.6 ENTIRE CONTRACT, AMENDMENTS TO BE IN WRITING

1. Add new general condition GC 1.6 ENTIRE CONTRACT, AMENDMENTS TO BE IN WRITING as follows:

"GC 1.6 ENTIRE CONTRACT, AMENDMENTS TO BE IN WRITING

1.6.1 The *Contract Documents* (including all properly authorized *Change Directives* and *Change Orders*) constitute the entire *Contract* between the parties. Each of the parties,

.1 acknowledges that it is not relying upon any representation, warranty, promise, instruction, advice or information received from the other party or from any employee or agent of the other party, except as set out in the *Contract Documents*;

.2 shall not rely at any time in the future on any representations, warranty, instruction, advice or information purportedly received from the other party or any employee or agent of the other party, except as set out in a properly authorized *Change Order*, *Change Directive* or in an amendment as provided under this section.

1.6.2 The *Contract* shall not be deemed to be or construed as having been amended as a result of any oral communication between the parties or as a result of any practice of the parties, but all amendments to the *Contract* shall be in writing and shall be signed by both parties, provided that any such amendment may be executed in counterpart form."

SC 10. GC 1.7 NON-DISCLOSURE AND NO COMMENT

1. Add new general condition GC 1.7 NON DISCLOSURE AND NO COMMENT as follows:

"GC 1.7 NON-DISCLOSURE AND NO COMMENT

1.7.1 The *Contractor* shall not disclose details relating to the *Contract*, *Work* or *Project* to any outside person not engaged in activities relating to the *Contract*, *Work* or *Project*, and shall restrain its employees from giving unauthorized information with respect thereto.

1.7.2 The *Contractor* shall refer all inquiries from whatever source relating to the works to be undertaken within the scope of the *Contract* to the *Consultant*."

SC 11. GC 1.8 OWNER'S ACCESS TO SITE

1. Add new general condition GC 1.8 OWNER'S ACCESS TO SITE as follows:

"GC 1.8 OWNER'S ACCESS TO SITE

1.8.1 The *Owner* shall have the right to enter and occupy the *Place of the Work* in whole or in part, for the purpose of placing fittings and equipment or for other uses before the issuance of the certificate of the *Substantial Performance of the Work*, where in the opinion of the *Consultant*, such entry and occupancy will not interfere unreasonably with the *Contractor*'s delivery of the *Work*.

1.8.2 Notwithstanding paragraph 1.8.1, the parties agree that during the term of the *Contract*, the *Owner* may inspect any and all aspects of the *Project*, at all reasonable times, for the purpose of ensuring that the *Contractor* is carrying out the *Work* and other obligations in accordance with the *Contract*."

SC 12. GC 1.9 PATENTS AND OTHER INTELLECTUAL PROPERTY

1. Add new general condition GC 1.9 PATENTS AND OTHER INTELLECTUAL PROPERTY as follows:

"GC 1.9 PATENTS AND OTHER INTELLECTUAL PROPERTY

1.9.1 Where the *Work* or *Project* to be carried out requires the installation or use of any patented or other protected intellectual property,

.1 belonging to the *Contractor*, the *Contract Price* shall be deemed to include the grant of a perpetual license from the *Contractor* to the *Owner* to make use of that intellectual property;

.2 belonging to any other person, the *Contractor* shall obtain and assign to the *Owner* a perpetual license from the owner thereof entitling the *Owner* to make use of that intellectual property, and the cost thereof shall be deemed to be included in the *Contract Price*."

SC 13. GC 2.1 AUTHORITY OF THE CONSULTANT

1. Delete from the end of paragraph 2.1.2, the following:

", the *Consultant* and the *Contractor*"

SC 14. GC 2.2 ROLE OF THE CONSULTANT

1. Add to the beginning of subparagraph 2.2.4 the following:

"After receipt of the *Contractor*'s invoices for payment,"

2. Delete from the beginning of paragraph 2.2.6, the following:

"Except with respect to GC5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER,"

3. Add to the end of paragraph 2.2.9, the following:

"and not more than forty-eight (48) hours after receipt of the written query unless otherwise agreed to by the parties."

4. Add after "with reasonable promptness" in paragraph 2.2.12, the following:

"but not more than five (5) *Working Days* after receipt of a written Request for Information from the *Contractor*"

5. Add after ", the *Consultant* does not guarantee" in the second sentence of paragraph 2.2.16, the following:

"to the *Contractor*"

6. Add to the end of paragraph 2.2.17, the following:

"The *Consultant* shall ensure that all such warranties and documents submitted for approval and for the *Owner's* records are in accordance with the *Contract Documents* prior to the documents being forwarded."

7. Delete from paragraph 2.2.18, the following:

"against whom the *Contractor* makes no reasonable objection and"

8. Add new paragraph 2.2.19 as follows:

"2.2.19 The *Consultant* will provide the *Contractor* in writing with bench marks and points of reference to be used by the *Contractor* in setting out the *Work*. The *Owner* will be responsible only for the correctness of the information so supplied. From these bench marks and points of reference the *Contractor* will do its own setting out. The setting out by the *Contractor* shall include but shall not be limited to the preparation of grade sheets, the installation of centre lines stakes, grades stakes, offsets and site rails."

SC 15. GC 2.3 REVIEW AND INSPECTION OF THE WORK

1. Add to end of paragraph 2.3.2, the following:

"Reasonable notice shall not be less than twenty-four (24) hours prior to the testing and inspection."

2. Add after "inspection reports relating to the *Work*" in paragraph 2.3.3, the following:

", and in any event no later than two (2) *Working Days* from the date of the inspection"

SC 16. GC 2.4 DEFECTIVE WORK

1. Add after "failing to conform to the *Contract Documents"* in paragraph 2.4.1, the following:

"at the *Contractor*'s expense"

2. Add new paragraphs 2.4.1.1, 2.4.1.2 as follows:

"2.4.1.1 The *Contractor* shall rectify, in a manner acceptable to the *Owner* and the *Consultant*, all defective work and deficiencies throughout the *Work*, whether or not they are specifically identified by the *Consultant*.

2.4.1.2 The *Contractor* shall prioritize and schedule the correction of any defective *Work* which, in the sole discretion of the *Owner*, adversely affects the day to day operation of the *Owner*."

SC 17. GC 3.1 CONTROL OF THE WORK

1. Add after "construction means, methods, techniques," in paragraph 3.1.2, the following:

"schedule,"

2. Add new paragraph 3.1.3, as follows:

"3.1.3 Prior to commencing individual procurement, 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 dimensions are not included 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."

SC 18. GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

1. Delete subparagraphs 3.2.2.1, 3.2.2.3 and 3.2.2.4 in their entirety.

2. Add to the end of subparagraph 3.2.2.2, the following:

"; the *Contractor* acknowledges that, if the *Owner* does not enter into any other contracts for the Project, the *Contractor* is the "constructor" and the "employer" within the meaning of the *Occupational Health and Safety Act (Ontario)* and the *Contractor* undertakes to carry out the duties, obligations and responsibilities of the constructor and the employer with respect to the *Project*. In the event that the *Owner* enters into more than one contract for the *Project*, or when work is performed by the *Owner's* own forces, the *Owner* agrees to fulfill all of the duties, obligations and responsibilities required under the *Occupational Health and Safety Act (Ontario)*. Without restricting the generality of any other term or condition in the *Contract,* the *Contractor* shall indemnify and hold harmless the *Owner* from any liability for claims, damages or penalties, including reasonable legal fees to defend any offences, arising from the *Contractor's* failure to comply with the duties, responsibility and obligations of the constructor and the employer under the *Occupational Health and Safety Act (Ontario)."*

3. Delete from the subparagraph 3.2.3.2, the following:

"that are identified in the *Contract Documents*"

4. Add new subparagraph 3.2.3.5 as follows:

"3.2.3.5 Subject to General Condition 6.1.1 Owners Right to Make Changes and GC 9.4 - CONSTRUCTION SAFETY, where paragraph 3.2.4 of GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS applies, for the *Owner's* own forces and for other contractors performing work within the construction site limits identified in the *Contract Documents*, assume overall responsibility for compliance with all aspects of the applicable health and safety legislation in the *Place of the Work*, including all of the responsibilities of the constructor as that term is defined in the *Occupational Health and Safety Act."*

SC 19. GC 3.4 CONSTRUCTION SCHEDULE

1. Delete paragraph 3.4.1 in its entirety and replace with the following:

"3.4.1 The *Contractor* shall:

.1 prior to the first application for payment, prepare and submit to the *Owner* and the *Consultant* for their review and acceptance, a construction schedule that indicates the timing of the 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* and in accordance with the *Contract Documents.* The *Contractor* shall employ construction scheduling software, where required by the *Specifications,* that permits the progress of the *Work* to be monitored in relation to the critical path established in the schedule. The *Contractor* shall provide the schedule and any successor or revised schedules in both electronic format and paper copy. Once accepted by the *Owner* and the *Consultant*, the construction schedule submitted by the *Contractor* shall become the baseline construction schedule, and any errors or omissions within that construction schedule not captured by the *Owner* and or *Consultant* as part of

schedule acceptance does not alleviate the *Contractor* of their responsibility to meet the *Contract Time* and the *Contractor* shall be required to make the necessary corrections to the schedule immediately to comply with the *Contract Time*;

.2 provide the expertise and resources, such resources including manpower and equipment, as are necessary to maintain progress under the accepted baseline construction schedule or any successor or revised schedule accepted by the *Owner* pursuant to GC 3.4 - CONSTRUCTION SCHEDULE;

.3 monitor the progress of the *Work* on a weekly basis relative to the baseline construction schedule, or any successor or revised schedule accepted by the *Owner* pursuant to GC 3.4 - CONSTRUCTION SCHEDULE, update the schedule on a monthly basis and advise the *Consultant* and the *Owner* in writing of any variation from the baseline or slippage in the schedule; and

.4 if, after applying the expertise and resources required under subparagraph 3.4.1.2, the *Contractor* forms the opinion that the variation or slippage in schedule reported pursuant to subparagraph 3.4.1.3 cannot be recovered by the *Contractor*, it shall, in the same notice, indicate to the *Consultant* and the *Owner* if the *Contractor* intends to apply for an extension of *Contract Time* as provided in PART 6 of the General Conditions - CHANGES IN THE WORK."

2. Add new paragraphs 3.4.2, 3.4.3, 3.4.4, 3.4.5, 3.4.6, 3.4.7, 3.4.8, 3.4.9 and 3.4.10 as follows:

"3.4.2 If, at any time, it should appear to the *Owner* or the *Consultant* that the actual progress of the *Work* is behind schedule or is likely to become behind schedule, or if the *Contractor* has given notice of such to the *Owner* or the *Consultant* pursuant to subparagraph 3.4.1.3, the *Contractor* shall take appropriate steps to cause the actual progress of the *Work* to conform to the schedule or minimize the resulting delay and shall produce and present to the *Owner* and the *Consultant* a recovery plan demonstrating how the *Contractor* will achieve the recovery of the schedule. If the *Contractor* intends to apply for a change in the *Contract Price* in relation to a schedule recovery plan, then the *Contractor* shall proceed in accordance with GC 6.5 – DELAYS.

3.4.3 Where a *Force Majeure* occurs, the *Consultant* shall determine the number of days (if any) to be allowed by reason thereof for the *Substantial Performance of the Work*.

3.4.4 An extension of time may be granted under this section by the *Consultant* where in the *Consultant's* reasonable opinion it is appropriate in all of the circumstances to do so;

.1 by reason of the occurrence of a *Force Majeure*;

.2 by reason of a *Change Directive* or *Change Order*;

.3 where the *Owner*, for any reason, directs that *Work* be discontinued;

provided that,

(1) an extension under subparagraph 3.4.4.1 shall not entitle the *Contractor* to any additional payment; and

(2) any other extension shall entitle the *Contractor* to additional overhead costs only to the extent that the *Consultant* is satisfied that such costs will increase by reason of the extension.

3.4.5 Any extension of time so granted shall not exceed the amount that is reasonably required. Requests for extension will be evaluated collectively, rather than on an individual *Change Directive* or *Change Order* basis, provided that the collective evaluation shall not be less frequently than at least once per quarter. There is no presumption that the time required to carry out a *Change Directive* or *Change Order* will necessarily extend the date of the *Substantial Performance of the Work* by the same length of time. Instead, the *Consultant* shall make an independent determination of whether an extension is required.

3.4.6 An extension of time under this section shall be for such time as the *Consultant* may prescribe as being fair and reasonable and the *Consultant* shall fix the terms on which the said extension may be granted.

3.4.7 An application for an extension of time as herein provided shall be made in writing by the *Contractor* to the *Consultant* through the *Change Order* process.

3.4.8 Any additional time granted for the completion of the *Contract* will be conditional upon the *Contractor* providing the *Owner* with evidence that all insurance, bonds or other securities, furnished to the *Owner* by the *Contractor*, have been increased and, if necessary, extended beyond the limit of the time extension.

3.4.9 Any extension of time that may be granted to the *Contractor* shall be so granted and accepted without prejudice to any rights of the *Owner* whatsoever under the *Contract* and all of such rights shall continue in full force and effect after the time limited in the *Contract* for the completion of the *Work*, and whenever in the *Contract* power and authority is given to the *Owner* or the *Consultant* or any person to take any action consequent upon the act, default, breach, neglect, delay, non-observance or non-performance by the *Contractor* in respect of the *Work* or *Contract*, or any portion thereof, such powers or authorities may be exercised from time to time and not only in the event of the happening of such contingencies before the time limited in the *Contract* for the completion of the *Work* but also in the event of the same happening after the time so limited in the case of the *Contractor* being permitted to proceed with the execution of the *Work* under an extension of time granted by the *Consultant*. In the event of the *Consultant* granting an extension of time, time shall continue to be deemed of the essence with respect to that extension.

3.4.10 Due to the time constraints regarding the *Project*, the *Contractor* shall maintain rigorous control of all elements of the *Work* for which the deadlines are indicated in the *Contract Documents*."

SC 20. GC 3.5 SUPERVISION

1. Delete paragraph 3.5.1 in its entirety and replace with the following:

"3.5.1 The *Contractor* shall furnish a competent and adequate staff, who shall be in attendance at the *Place of the Work* at all times, as necessary, for the proper

administration, co-ordination, supervision and superintendence of the *Work*; organize the procurement of all materials and equipment so that they will be available at the time they are needed for the *Work*, and keep an adequate force of skilled workmen on the job to complete the *Work* in accordance with all requirements of the *Contract Documents.* The appointed representatives shall not be changed except for valid reasons, at no additional cost to the *Owner*, and upon the *Contractor* obtaining the *Owner's* written consent, which consent will not be unreasonably withheld. Further, the *Contractor* shall not employ or continue to employ on the *Work* anyone to whom the *Owner* may reasonably object."

2. Add new paragraphs 3.5.3, 3.5.4, 3.5.5, 3.5.6, 3.5.7, 3.5.8 and 3.5.9 as follows:

"3.5.3 The *Contractor* shall at all times have at the *Place of Work*, a full-time and competent construction superintendent who shall be capable of reading and thoroughly understanding plans and specifications and of adequately communicating with the *Consultant* and its representatives and who also must be thoroughly experienced in the type of *Work* being performed, and who shall be the recipient of all instructions from the *Consultant* or its authorized representatives. No work of any kind shall be carried out by the *Contractor* or its *Subcontractors* during prolonged absence of the construction superintendent.

3.5.4 The construction superintendent shall have full authority to execute the orders or directions of the *Consultant* without delay, and to promptly provide such materials, equipment, tools, labour and incidentals as may be required. The *Contractor* shall provide a superintendent regardless of the amount of *Work* subcontracted.

3.5.5 The *Contractor* shall provide the *Consultant* with the telephone and the address of its appointed representative(s), who could be contacted on matters relating to the *Contract*, (e.g. urgent messages or emergencies), and who shall be available within reasonable notice, twenty-four (24) hours a day, seven (7) days a week, on matters relating to the *Contract*.

3.5.6 The *Owner* may, at any time during the course of the *Work*, request the replacement of the appointed representative(s), where the grounds for the request involve incompetent or disorderly conduct or conduct which jeopardizes the safety and security of the site or the *Owner's* operations. Immediately upon receipt of the request, the *Contractor* shall make arrangements to appoint an acceptable replacement at no additional cost to the *Owner*.

3.5.7 The *Contractor* shall cause each *Subcontractor* at all times while the *Work* is being carried out, to have a fully competent supervisor at the *Place of the Work*, who is thoroughly familiar with all aspects of the *Project* for which that *Subcontractor* is responsible.

3.5.8 The superintendent shall not be employed in any other capacity at the *Place of Work*. Where it is necessary to employ a superintendent in some other capacity,

the *Consultant* shall approve the extent to which a labour time charge may be claimed by the *Contractor* or a *Subcontractor* in respect of that superintendent.

3.5.9 The *Contractor* acknowledges that the replacement of the construction superintendent or project team members will have significant impacts on the *Project* schedule and quality of the *Work*; therefore, all measures will be taken by the *Contractor* in order to maintain the original team assigned to the *Project*. Replacement of any team members will result in a possible delay to the *Project* and will be the responsibility of the *Contractor* to make-up any such delays."

SC 21. GC 3.6 SUBCONTRACTORS AND SUPPLIERS

1. Add to the end of paragraph 3.6.2, the following:

"Failure on the part of the *Contractor* to indicate in writing such *Subcontractors* and *Suppliers* to the *Owner*, shall be deemed to be a failure or refusal to enter into the *Contract*."

2. Add to the end of paragraph 3.6.4, the following:

"at the discretion of the *Consultant.*"

3. Add new paragraph 3.6.7 as follows:

"3.6.7 The *Contractor* shall not change any of the *Subcontractors* or *Suppliers* proposed by the *Contractor* in writing and accepted by the *Owner* at the signing of the *Contract* without the *Owner's* written consent or execute any subcontracts for the performance of the *Work* without the *Owner's* prior written consent."

SC 22. GC 3.7 LABOUR AND PRODUCTS

1. Add new paragraphs 3.7.4, 3.7.5, 3.7.6, 3.7.7, 3.7.8, 3.7.9, 3.7.10, 3.7.11, 3.7.12, 3.7.13, 3.7.14 and 3.7.15 as follows:

"3.7.4 The cost for overtime required beyond the normal *Working Day* to complete individual construction operations of a continuous nature, such as pouring or finishing of concrete or similar work, or work that the *Contractor* elects to perform at overtime rates without the *Owner* or the *Consultant* requesting it shall not be chargeable to the *Owner* and shall be at the sole cost and expense of the *Contractor*.

3.7.5 The *Contractor* shall comply with all requirements set out in the *Fair Wage Policy*. The *Owner* has adopted the *Fair Wage Policy*, respecting contractors and subcontractors that must be adhered to on this *Project*.

3.7.6 The *Contractor* shall comply in all respects with the *Fair Wage Policy* and is fully responsible for ensuring that all of its *Subcontractors* also comply in all respects with the *Fair Wage Policy*.

3.7.7 All workers employed by the *Contractor* and its *Subcontractors* in connection with the *Work* or *Project* shall be paid or provided with wages, benefits and hours of work in accordance with the *Fair Wage Policy* which were in effect on the date of the closing of the request for tenders/request for proposals for the *Contract*.

3.7.8 The *Contractor* is responsible for the safe on-site storage of *Products* and their protection (including *Products* supplied by the *Owner* and other contractors to be installed under the *Contract*) in such ways as to avoid dangerous conditions or contamination of the *Products* or other person or property and in locations at the *Place of the Work* to the satisfaction of the *Owner* and the *Consultant*. The *Owner* shall provide all relevant information on the *Products* to be supplied by the *Owner* within the *Contract Documents*.

3.7.9 The *Contractor* shall neither permit nor allow underaged persons contrary to *Applicable Laws*, the introduction or use of alcoholic beverages or illegal narcotics on or about the *Place of the Work*.

3.7.10 At the request of the *Owner* or *Consultant*, the *Contractor* shall remove from the *Place of the Work*, any person (whether employed on the *Work* or not) who, in the opinion of the *Owner* or *Consultant*, is incompetent, intoxicated or otherwise impaired, or who is conducting himself (or herself) improperly, and the *Contractor* shall not permit any such person to remain on the *Place of the Work*, nor to return to the *Place of the Work* without the written approval of the *Owner* or *Consultant* as the case may be.

3.7.11 Where required by the *Consultant*, the *Contractor* shall furnish a complete written statement of the origin, composition and manufacture of all materials to be supplied by them, and shall furnish samples thereof for testing purposes, if so instructed by the *Consultant*.

3.7.12 The *Consultant*'s approval of changed materials shall not be considered as waiver of objection to the *Work* or materials at any subsequent time due to their failure to conform to the *Specifications*.

3.7.13 The *Contractor* shall furnish for the *Consultant*'s approval, such material tests, mock-ups, mix designs and tests of items and/or materials manufactured or fabricated off the *Place of the Work* as the *Consultant* may reasonably request.

3.7.14 Specified product by name, trade or company is regarded as the standard of quality required by the *Specifications*. No substitution shall be made by the *Contractor* without the prior written approval of the *Owner*.

3.7.15 By-law 07-170 (City of Hamilton Licensing Code) as amended from time to time, regulates the trade licensing process in Hamilton. The By-law regulates all businesses of plumbing, heating, ventilation and air-conditioning, drain laying and building repair. The City of Hamilton’s Standards & Licensing Section is responsible for the licensing of contractors and masters. Licenses are issued to contractors and masters working in the above noted trades.”

SC 23 GC 3.8 SHOP DRAWINGS

1. Delete the word "and" in subparagraph 3.8.3.2 and add the word "and" to the end of subparagraph 3.8.3.2.

2. Add new subparagraph 3.8.3.3 as follows:

   ".3 the *Contractor* shall ensure completeness and accuracy of all *Shop Drawings* in accordance with *the Contract Documents."*

3. Add new paragraphs 3.8.8, 3.8.9, 3.8.10, 3.8.11 and 3.8.12 as follows:

   "3.8.8 Upon request of the *Contractor* or the *Consultant*, they shall jointly prepare a schedule of the dates for provision, review and return of *Shop Drawings*.

   3.8.9 The *Contractor* shall provide *Shop Drawings* in the form specified, or if not specified, as directed by the *Consultant.*

   3.8.10 *Shop Drawings* provided by the *Contractor* to the *Consultant* shall indicate by stamp, date and signature of the person responsible for the review that the *Contractor* has reviewed each one of them.

   3.8.11 *Shop Drawings* which require approval of any legally constituted authority having jurisdiction shall be provided to such authority by the *Contractor* for approval.

   3.8.12 The *Contractor* shall provide revised *Shop Drawings* to correct those which the *Consultant* rejects as inconsistent with the *Contract Documents,* unless otherwise directed by the *Consultant.* The *Contractor* shall notify the *Consultant* in writing of any revisions to the *Shop Drawings* other than those requested by the *Consultant*."

SC 24. GC 3.9 DOCUMENT REVIEW

1. Add new general condition GC 3.9 DOCUMENT REVIEW as follows:

   "GC 3.9 DOCUMENT REVIEW

   1.9.1. The *Contractor* shall review the *Contract Documents* and shall report promptly to the *Consultant* any error, inconsistency or omission the *Contractor* may discover. Such review by the *Contractor* shall comply with the standard of care described in paragraph 3.14.1 of the *Contract*. Except for its obligation to make such review and report the result, the *Contractor* does not assume any responsibility to the *Owner* or to the *Consultant* for the accuracy of the *Contract Documents*. The *Contractor* shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the *Contract Documents*, which the *Contractor* could not reasonably have discovered. If the *Contractor* does discover any error, inconsistency or omission in the *Contract Documents,*

the *Contractor* shall not proceed with the work affected until the *Contractor* has received corrected or missing information from the *Consultant*.

1.9.2 The *Contractor* shall follow the procedures as set forth in the *Contract Documents*. All requests are to be formal, written, and tracked, beginning with a *Request for Information* from the *Contractor*. If the *Request for Information* results in a change to the *Work* as specified in the *Contract Documents*, the *Consultant* will then issue a written request for *Change Order*, as set forth in GC 6 - CHANGES IN THE WORK.

1.9.3 If, at any time, the *Contractor* finds errors, inconsistencies, or omissions in the *Contract Documents* or has any doubt as to the meaning or intent of any part thereof, the *Contractor* shall immediately notify the *Consultant*, through a *Request for Information*. The *Contractor* shall not proceed with the work until the *Consultant* has responded to the *Request for Information*, and in dealing with such error, inconsistency or omission the *Contractor* shall co-operate with the *Owner* and the *Consultant* in good faith to resolve such errors, inconsistency or omission so as to avoid any increase in the *Contract Price* or delay in the progress of the *Work*. Neither the *Owner* nor the *Consultant* will be responsible for the consequences of any action of the *Contractor* based on oral instructions."

SC 25. GC 3.10 DOCUMENTS AT THE SITE

1. Add new general condition GC 3.10 DOCUMENTS AT THE SITE as follows:

"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*."

SC 26. GC 3.11 USE OF THE WORK

1. Add new general condition GC 3.11 USE OF THE WORK as follows:

"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 employees and *Subcontractors* to limits indicated by laws, ordinances, permits, or the *Contract Documents* and shall not unreasonably encumber the *Place of the Work*.

3.11.2 The *Contractor* shall not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the safety of the *Work*.

3.11.3 The *Contractor* shall abide by and enforce directives and policies regarding signs, advertisements, safety procedures, fires and smoking at the *Place of the Work* as directed by the *Owner*."

SC 27. GC 3.12 CUTTING AND REMEDIAL WORK

1. Add new general condition GC 3.12 CUTTING AND REMEDIAL WORK as follows:

"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 Should the *Owner*, the *Consultant*, other contractors or anyone employed by them 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.

3.12.4 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*."

SC 28. GC 3.13 CLEANUP

1. Add new general condition GC 3.13 CLEANUP as follows:

"GC 3.13 CLEANUP

3.13.1 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*, other contractors or their employees.

3.13.2 Before applying for *Substantial Performance of the Work* as provided in GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK, the *Contractor* shall remove waste products and debris, other than that resulting from the work of the *Owner*, other contractors or their employees, and shall leave the *Place of the Work* clean and suitable for use or occupancy by the *Owner*. The *Contractor* shall remove products, tools, *Construction Equipment*, and *Temporary Work* not required for the performance of the remaining work.

3.13.3 Prior to application for the final payment, the *Contractor* shall remove any remaining products, tools, *Construction Equipment*, *Temporary Work*, and waste products and debris, other than those resulting from the work of the *Owner*, other contractors or their employees.

3.13.4 The *Owner* shall have the right to set-off the cost of cleaning to the *Contractor* if it is not done within twenty-four (24) hours of written notice to clean and the *Owner* shall have the right to set-off the cost of damage to the *Place of the Work* caused by the *Contractor's, the Subcontractor's* or the *Supplier's* transportation in and out of the *Place of the Work* if not repaired within five (5) *Working Days* of written notice to repair or before final payment, whichever is earlier.

3.13.5 All material delivered to the *Place of the Work* shall be neatly stored or contained upon delivery only in areas as approved by the *Owner* or the *Consultant* and shall be secured and remain in the *Contractor's* control until installed.

3.13.6 The *Contractor* shall legally dispose forthwith of any debris and surplus material accumulated at the *Place of the Work*, and where requested, the *Contractor* shall provide to the *Consultant* a true copy of the original certificate approval from a waste management system and a true copy of the original certificate of approval from the place of disposal for all debris and surplus material disposed of by the *Contractor* under the *Contract*."

SC 29. GC 3.14 PERFORMANCE BY CONTRACTOR

1. Add new general condition GC 3.14 PERFORMANCE BY CONTRACTOR as follows:

"GC 3.14 PERFORMANCE BY CONTRACTOR

3.14.1 In performing its services and obligations under the *Contract*, the *Contractor* shall exercise a standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The *Contractor* acknowledges and agrees that throughout the *Contract,* the *Contractor's* obligations, duties and responsibilities shall be interpreted in accordance with this standard. The *Contractor* shall exercise the same standard of due care and diligence in respect of any *Products*, personnel, or procedures which it may recommend to the *Owner*.

3.14.2 The *Contractor* further represents, covenants and warrants to the *Owner* that:

.1 the personnel it assigns to the *Project* are appropriately experienced;

.2 it has a sufficient staff of qualified and competent personnel to replace any vacancy, subject to the *Owner's* approval, resulting from death, incapacity, removal or resignation; and

.3 there are no pending, threatened or anticipated claims that would have a material effect on the financial ability of the *Contractor* to perform its work under the *Contract*."

SC 30. GC 3.15 SECURITY

1. Add new general condition GC 3.15 SECURITY as follows:

"GC 3.15 SECURITY

3.15.1 The *Contractor* is responsible to provide and maintain the *Place of the Work* in a secure manner, free from public access, trespassing, or vandalism. This provision is to be maintained on a twenty-four (24) hours per day, seven (7) days per week basis and may require such items as fencing, hoarding, lighting, security guards or systems, and security cameras."

SC 31. GC 4.1 CASH ALLOWANCES

1. Add after "*Contractor's*," in paragraph 4.1.2, the following:

   *"*and *Subcontractor's"*

2. Add new paragraph 4.1.8 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 from cash allowances."

SC 32. GC 4.2 CONTINGENCY ALLOWANCE

1. Add new paragraphs 4.2.5 and 4.2.6:

   "4.2.5 Any contingency allowance specified in the *Contract Documents*, the *Owner*'s Council resolution with respect to the *Contract*, or elsewhere, shall be deemed to be solely a budgetary authorization by the *Owner*. The *Contractor* shall have no right to draw upon any such contingency allowance for payment unless specifically authorized to do so by way of *Change Order*.

   4.2.6 In the absence of a contingency allowance being shown on the *Contract Documents*, the *Contractor* is not to assume that there is one in place. The disclosure of any contingency allowances is at the discretion of the *Owner*."

SC 33. GC 4.3 PROVISIONAL AMOUNTS

1. Add new general condition GC 4.3 PROVISIONAL AMOUNTS as follows:

   "GC 4.3 PROVISIONAL AMOUNTS

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

   4.3.2 The *Contractor* is not entitled to payment of any provisional items except for the extra or additional work carried out by the *Contractor*, as directed by the *Owner* and in accordance with the *Contract* and only to the extent of such extra or additional work and payment approved by the *Owner*.

   4.3.3 The *Owner* reserves the right to delete from the *Contract Price* any of the provisional items identified in the *Form of Tender*, for credit at the price shown. All prices are inclusive of all duties and taxes applicable, except *Value Added Taxes*."

SC 34. GC 5.1 PROVISIONAL AMOUNTS

1. Delete GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER in its entirety.

SC 35. GC 5.2 APPLICATIONS FOR PAYMENT

1. Add to the end of paragraph 5.2.1, the following:

   "Applications for payment shall be in accordance with the Construction Act and made by way of a *Notice in Writing* delivered by electronic communication, or as may be otherwise agreed, to both the *Consultant* and the *Owner*."

2. Add to the end of paragraph 5.2.3, the following:

   "The *Contractor* shall review with the *Consultant* and the *Owner*, at a scheduled time, the percentage of work completed for each item indicated in the schedule of values. This procedure shall be complied with for each application for payment prior to submitting the formal application for payment."

3. Delete paragraph 5.2.5 in its entirety and replace with the following:

   "The schedule of values shall be made out in such form and supported by such evidence as the *Consultant* may reasonably direct and when accepted by the *Consultant*, shall be used as the basis for applications for payment, unless it is found to be in error."

4. Delete paragraph 5.2.7 in its entirety and replace with the following:

   "Each application for payment shall meet the requirements of a "proper invoice" as defined in the *Construction Act* (Ontario) if the *Contractor* includes the following:
   - a statement based on the schedule of values, which statement shall include the *Contract* number, *Project* name and purchase order number;
   - breakdown of approved *Change Orders* and percentage completed of each;.
   - a *Statutory Declaration* as required by paragraph 5.2.9;
   - any other requirement that the *Construction Act* (Ontario) prescribes for a proper invoice; and
   - 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. Add to the end of paragraph 5.2.8, the following:

   "Any *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall remain at the risk of the *Contractor* notwithstanding that title has passed to the *Owner* pursuant to General Condition 13.1 - OWNERSHIP OF MATERIALS."

6. Add new paragraphs 5.2.9, 5.2.10, 5.2.11, 5.2.12, 5.2.13, 5.2.14 and 5.2.15, as follows:

   "5.2.9 The *Contractor* must provide with each application of a proper invoice after the first, a *Statutory Declaration*, certifying that all accounts for all subcontract, construction machinery and equipment, materials, *Products*, labour and other indebtedness which may have been incurred by the *Contractor* and for which the *Owner* might in any way be held responsible have been paid in full or will

be paid with the proceeds from such application for payment, except for amounts properly retained as holdback or as an identified amount in dispute.

5.2.10 After the first application for payment and with each subsequent application for payment the *Contractor* shall submit evidence of compliance with the applicable worker's compensation legislation at the *Place of the Work,* including payments due thereunder.

5.2.11 Subject to the *Construction Act* and all other *Applicable Laws*, the *Owner* will pay to the *Contractor* ninety percent (90%) of the amount shown on such application for payment, subject to any amount that is disputed, and where the *Owner* has received notice of a lien, an amount sufficient to satisfy the lien may be retained , less previous payments, less the amount of any liens or any written notice of a lien of which the *Owner* has notice, plus 25% for security for costs, less the maintenance security referred to in GC 12.3 – WARRANTY, and less any amounts that the *Owner* deems necessary to retain for its protection against claims or liabilities or for any claim or claims the *Owner* may have against the *Contractor* under the *Contract*, other contracts, or otherwise, and such payments shall not in any way be construed as, nor shall it constitute, an acceptance of all or any part of the *Work* or material under the *Contract*. Once the reason for the *Owner* being entitled to withhold payment of any amount has been rectified, the amount withheld due to that reason will be paid by the *Owner* to the *Contractor.*

5.2.12 Deviation or incomplete submissions with respect to the breakdown of approved *Change Orders* and percentage completed of each will require resubmission of the application for payment.

5.2.13 If any *Work* or item under the *Contract* is included by the *Contractor* in its progress claims as partially or fully completed, but it is not completed in accordance with *Drawings* or *Specifications*, or is not completed to the *Consultant*'s satisfaction, the *Consultant* shall omit the partial or total cost of such items from the certificates of payment and shall notify the *Contractor* in writing of its action and the reason for same, and shall withhold payments for such items, over, above and distinct from applicable construction lien holdbacks, until they are completed or corrected to its full satisfaction.

5.2.14 The *Consultant* and/or the *Owner* shall not be held responsible for any delays in payment due to a disagreement in the amounts shown by the *Contractor* on their payment application as submitted to the *Consultant* for review.

5.2.15 The *Contractor* shall not submit an application for payment between the period of December 14 to January 4, inclusive, in any year. The *Contractor* shall not submit an application for payment during any other reasonable period which the *Owner* advises the *Contractor* in writing due to downtime for payment system upgrades."

SC 36. GC 5.3 PAYMENT

1. Delete "10 calendar days" in subparagraph 5.3.1.1 and replace with "5 calendar days".

SC 37. GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

1. Add to the beginning of paragraph 5.4.1:

   "When the *Contractor* considers that the *Work* is substantially performed, or if permitted by the lien legislation applicable to the *Place of the Work* a designated portion thereof which the *Owner* agrees to accept separately is substantially performed, the *Contractor* shall, within one *Working Day*, deliver to the *Consultant* and to the *Owner* a comprehensive list of items to be completed or corrected, together with 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*. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*."

2. Delete paragraphs 5.4.2 and 5.4.3 in their entirety.

3. Add new paragraph 5.4.2 as follows:

   "The prerequisites to attaining Substantial Performance includes but is not limited to the following:
   .1 Evidence of compliance with the requirements for occupancy or occupancy permit as prescribed by the authorities having jurisdiction
   .2 Final cleaning and waste removal at the time of applying for *Ready-for-Takeover,* as required by the *Contract Documents*.
   .3 The delivery to the *Owner* of such operations and maintenance documents reasonably necessary for immediate operation and maintenance, as required by the *Contract Documents* .
   .4 Make available a copy of the as-built drawings completed to date on site.
   .5 Startup, testing required for immediate occupancy, as required by the *Contract Documents*.
   .6 Ability to secure access to the *Work* has been provided to the *Owner,* if required by the *Contract Documents."*

4. Add to the end of paragraph 5.4.4, the following:

   "and submit CCDC 9A 'Statutory Declaration' to state that all accounts for labour, subcontracts, *Products*, *Construction Equipment,* and other indebtedness which may have been incurred by the *Contractor* in the *Substantial Performance of the Work* and for which the *Owner* might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute."

5. Add after "Where legislation" in subparagraph 5.4.5, the following:

   "and the Contract"

SC 38. GC 5.5 FINAL PAYMENT

1. Delete paragraph 5.5.1 in its entirety and replace with the following:

   "5.5.1 When the *Contractor* considers that the *Work* is completed, the *Contractor* shall submit an application for final payment. The *Contractor's* application for final payment shall be accompanied by any documents or materials not yet delivered pursuant to paragraph 5.4.2 and, for purposes of the *Construction Act*, the remaining *Work* is valued at more than $5,000. The *Work* shall be deemed not to be performed until all of the aforementioned documents have been delivered. Application for final payment shall be made by way of *Notice in Writing* and shall be delivered by electronic communication to both the *Consultant* and the *Owner*. Application for final payment shall meet the requirements of a "proper invoice" as set out in paragraph 5.2.7."

2. Delete "10 calendar days" in paragraph 5.5.2 and replace with "5 calendar days".

3. Delete "5 calendar days after the issuance of a final certificate for payment" in paragraph 5.5.4 and replace with "the deadline prescribed by the *Construction Act* (Ontario)".

4. Add new paragraph 5.5.5 as follows:

   "5.5.5 Prior to the release of the holdback for finishing work under the *Construction Act*, the *Contractor* shall submit:
   .1 *Contractor's* written request for release of the holdback, including a statement that no written notices of lien have been received by it;
   .2 a *Statutory Declaration*; and
   .3 a final Workplace Safety & Insurance Board Clearance Certificate."

SC 39. GC 5.6 WITHHOLDING OF PAYMENT

1. Delete "or if" in paragraph 5.6.1 and replace with "and where".

SC 40. GC 5.8 LIENS

1. Add new general condition GC 5.8 LIENS as follows:

   "GC 5.80 LIENS

   5.8.1 In the event that a construction lien arising from the performance of the *Work* is claimed, the *Contractor* shall, if requested, undertake the *Owner's* defence of any subsequent lawsuit commenced in respect of the lien at the *Contractor's* sole expense.

   5.8.2 Without limiting any of the foregoing, the *Contractor* shall indemnify the *Owner* for all costs (including, without limitation, legal fees on a solicitor and client basis) it may incur in connection with the claim for lien or subsequent lawsuit brought in connection with the lien, or in connection with any other claim or lawsuit brought against the *Owner* by any person that provided services or materials to the *Project* lands which constituted a part of the *Work*.

5.8.3 This GC 5.8 does not apply to construction liens claimed by the *Contractor*."

SC 41. GC 5.9 PAYMENT BY ELECTRONIC FUNDS TRANSFER

1. Add new general condition GC 5.9 PAYMENT BY ELECTRONIC FUNDS TRANSFER as follows:

"GC 5.9 PAYMENT BY ELECTRONIC FUNDS TRANSFER

5.9.1 The term "EFT" refers to electronic funds transfer and may also include the payment information transfer.

5.9.2 All payments by the *Owner* under the *Contract* shall be made by EFT as a direct deposit to a Canadian chartered bank, save and except where:

.1 the funds payable under the terms of the *Contract* are only payable in a single lump sum and not payable by installments or progress payments or otherwise than a single lump sum payment; or

.2 the *Owner* is unable to release one or more payments by EFT, in which case the *Contractor* shall agree to accept payment by cheque or some other mutually agreeable method of payment.

5.9.3 Mandatory Submission of the *Contractor*'s EFT Information

.1 The *Contractor* is required to provide the *Owner* with the information required for the *Owner* to make payment by EFT. A purchase order may not be issued to the *Contractor* without this requisite information.

.2 In the event that the EFT information changes, the *Contractor* shall be responsible for providing forthwith the updated information to the *Owner*.

.3 Where the *Contractor* provides changes to the EFT information more than once in a calendar year, the *Contractor* shall also pay any fee approved by the Council of the City of Hamilton for each additional change.

.4 If the EFT information changes after submission of correct EFT information, the *Owner* shall have thirty (30) calendar days within which to update the changed EFT information after its receipt by the designated officer to the extent payment is made by EFT.

5.9.4 Liability for Uncompleted or Erroneous Transfers

.1 If an uncompleted or erroneous transfer occurs because the *Owner* used the *Contractor*'s EFT information incorrectly, the *Owner* remains responsible for making a correct payment.

.2 If an uncompleted or erroneous transfer occurs because the *Contractor*'s EFT information was incorrect, or was revised within thirty (30) calendar days of the *Owner*'s release of the EFT payment transaction instruction, and

.3 Funds are no longer under the control of the *Owner*'s payment office, the *Owner* is deemed to have made payment and the *Contractor* is responsible for recovery of any erroneously directed funds and to comply with the Payment Legislation.

5.9.5 EFT and Timely Payment
A payment shall be deemed to have been made in a timely manner in accordance with the payment terms of the *Contract* if, in the *Owner*'s EFT payment transaction instruction released to its bank, the date specified for settlement of the payment is on or before the last date for due payment under the terms of the *Contract*, provided the specified payment date is a valid date when the *Owner's* bank is open for business.

5.9.6 Liability for Change of EFT Information by Financial Agent
The *Owner* is not liable for errors resulting from changes to EFT information provided by the *Contractor*'s financial agent."

SC 42. GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

1. Add new paragraph 6.1.3 as follows:

"6.1.3 The *Contractor* is not entitled to any compensation for loss or loss of anticipated profit as a result of the deletion of any major item or major part of an item."

SC 43. GC 6.2 CHANGE ORDER

2. Add after "in a form that can be reasonably evaluated" in subparagraph 6.2.1 and add "and is acceptable to the *Consultant".*

SC 44. GC 6.3 CHANGE DIRECTIVE

1. Delete subparagraph 6.3.6.3 in its entirety and replace with the following:

".3 The *Contractor's* fee shall be as specified in GC 6.7 - EXTRA WORK, CLAIMS PAYMENT FROM CONTINGENCY or as otherwise agreed by the parties."

2. Delete subparagraph 6.3.7 in its entirety and add the following:

"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:*

.1 salaries, wages and benefits paid to personnel in the direct employ of the *Contractor* while directly engaged in the *Work* attributable to the change under a salary or wage schedule agreed upon by the *Owner* and the *Contractor*, or in the absence of such a schedule, actual salaries, wages and benefits paid under applicable bargaining agreement, and in the absence of a salary or wage schedule and bargaining agreement, actual salaries, wages and benefits paid by the *Contractor* while directly engaged in the *Work* attributable to the change, for personnel

(1) stationed at the *Contractor's* field office, in whatever capacity employed;

(2) engaged in the preparation or review of *Shop Drawings,* fabrication drawings, and coordination drawings; or

(3) engaged in the processing of changes in the *Work;*

.2 contributions, assessments or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan, insofar as such cost is based on wages, salaries or other remuneration paid to employees of the *Contractor* and included in the cost of the *Work* as provided in paragraph 6.3.7.1;

.3 travel and subsistence expenses of the *Contractor*'s personnel described in paragraph 6.3.7.1;

.4 all *Products* including cost of transportation thereof;

.5 materials, supplies, *Construction Equipment*, *Temporary Work*, exclusive of hand tools, including transportation and maintenance thereof, which are consumed in the performance of the *Work*; and cost less salvage value on such items used but not consumed, which remain the property of the *Contractor*;

.6 all tools and *Construction Equipment*, exclusive of hand tools used in the performance of the *Work*, whether rented from or provided by the *Contractor* or others, including installation, minor repairs and replacements, dismantling, removal, transportation, and delivery cost thereof;

.7 all equipment and services required for the *Contractor*'s field office;

.8 deposits lost;

.9 the amounts of all subcontracts provided however that the cost included in such amounts shall be limited to the actual costs of the items described in this paragraph 6.3.7 changing "*Contractor*" to "*Subcontractor*" as necessary;

.10 quality assurance such as independent inspection and testing services;

.11 charges levied by authorities having jurisdiction at the *Place of the Work*;

.12 royalties, patent licence 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;

.13 any adjustment in premiums for all bonds and insurance which the *Contractor* is required, by the *Contract Documents*, to purchase and maintain;

.14 any adjustment in taxes, other than *Value Added Taxes*, and duties 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 incurred in relation to the performance of the *Work*;

.17 removal and disposal of waste products and debris; and

.18 safety measures and requirements not caused by the *Contractor* or anyone for whom it is responsible."

3. Delete paragraph 6.3.9 in its entirety and replace with the following:

"6.3.9 The *Contractor* shall keep full and detailed accounts and records, including all documents and invoicing from the *Contractor, Subcontractor* and *Supplier*, for the documentation of the cost of performing the *Work* attributable to the *Change Directive* and shall provide the *Consultant* with copies upon submission of any claim for costs related to the *Change Directive* as included in an application for payment."

4. Add to the end of paragraph 6.3.10, the following:

   "The *Contractor* shall include all pertinent documentation as back-up with any claims for additional *Contract Time* and/or increase in *Contract Price* to the *Consultant* for review and approval."

5. Add after "proposed adjustment in the *Contract Time* from paragraph 6.3.12, the following:

   "and/or *Contract Price*"

SC 45. GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

1. Add new paragraph 6.4.5 as follows:

   "6.4.5 If the *Contractor* was given access to the *Place of the Work* prior to the submission of the bid on which the *Contract* was awarded, then the *Contractor* confirms that it carefully investigated the *Place of the Work* and, in doing so, applied to that investigation the degree of care and skill required by paragraph 3.14.1. In those circumstances, notwithstanding the provisions of paragraph 6.4.1, the *Contractor* is not entitled to an adjustment to the *Contract Price* or to an extension of the *Contract Time* for conditions which could reasonably have been ascertained by the *Contractor* by such careful investigation, or which could have been reasonably inferred from the material provided with the *Contract Documents*. In those circumstances, should a claim arise, the *Contractor* will have the burden of establishing that it could not have discovered the materially different conditions from a careful investigation, because of restrictions placed on its access or inferred the existence of the conditions from the material provided with the *Contract Documents*."

SC 46. GC 6.5 DELAYS

1. Delete paragraph 6.5.1 in its entirety and replace with the following:

   "6.5.1 If the *Contractor* is delayed in the performance of the *Work* by an action or omission of the *Owner, Consultant* or anyone employed or engaged by the *Owner* directly, 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, provided that the *Owner* shall not be liable for any other costs or damages whatsoever including, without limitation, any indirect, consequential, or special damages, such as loss of profits, loss of opportunity or loss of productivity resulting from such delay."

2. Delete the words "Ready-for-Takeover" in paragraph 6.5.2 and replace with "Substantial Performance".

3. Add to the end of paragraph 6.5.2, the following:

", provided that the *Owner* shall not be liable for any other costs or damages whatsoever including, without limitation, any indirect, consequential, or special damages, such as loss of profits, loss of opportunity or loss of productivity resulting from such delay."

4. Delete paragraph 6.5.3 in its entirety and replace with the following:

"6.5.3 If the *Contractor* is delayed in the performance of *Work* by *Force Majeure* 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, Consultant* or anyone employed or engaged by them directly, provided that the *Owner* shall in such instance, only be liable for reasonable costs incurred by the *Contractor* and shall not be liable for any other costs or damages whatsoever including, without limitation, any indirect, consequential, or special damages, such as loss of profits, loss of opportunity or loss of productivity resulting from such delay. Notwithstanding the foregoing, the *Contractor* shall use its best efforts to minimize the impact of such event upon the performance of the *Work* and *Contract Time.*

1. Subject to the foregoing, each party shall be excused from performance so long as the *Force Majeure* persists, and shall not be considered to be in default under this section, if and to the extent that its failure of, or delay in performance is due to that *Force Majeure*.
2. Where a *Force Majeure* remains in effect for more than ninety (90) calendar days, either party may terminate the *Contract* upon thirty (30) calendar days written notice to the other party, provided at the time when that notice is given the *Force Majeure* is then continuing.
3. While a *Force Majeure* subsists which prevents the *Contractor* from proceeding with the *Work* under the *Contract*, the *Owner* may engage an alternate contractor on an interim basis, and the *Work* and the *Contract Price* will be adjusted accordingly."

5. Add new paragraph 6.5.6 as follows:

"6.5.6 Where the *Project* is not totally completed within twenty (20) *Working Days* of the *Substantial Performance Date*, or at a time mutually agreed to by the parties, the *Owner* has the right to complete any remaining deficiencies or outstanding work and deduct the amount from monies that may be due or payable to the *Contractor."*

SC 47. GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

1. Add new paragraph 6.6.7 as follows:

"6.6.7 The *Owner* may make claims against the *Contractor* arising out of the costs incurred for additional services provided by the *Consultant* resulting from the *Contractor's* failure to reasonably perform the *Work* in accordance with the terms and conditions of the *Contract*."

SC 48. GC 6.7 EXTRA WORK, CLAIMS, PAYMENT FROM CONTINGENCY

1. Add new general condition GC 6.7 EXTRA WORK, CLAIMS, PAYMENT FROM CONTINGENCY, as follows:

"GC 6.7 EXTRA WORK, CLAIMS, PAYMENT FROM CONTINGENCY.

6.7.1 When a change in the *Work* is proposed or required, the *Consultant* may, on behalf of the *Owner*, issue a *Contemplated Change Order* to the *Contractor*. The *Contractor* shall upon receipt of a *Contemplated Change Order* promptly present to the *Consultant* a method of adjustment or, pursuant to paragraph 6.7.2, 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*.

6.7.2 When the *Contractor* submits an amount of adjustment in response to a *Contemplated Change Order* or a *Change Directive*, the following provisions shall apply:

.1 Where the scope of *Work* identified by the *Contemplated Change Order* or *Change Directive* involves an adjustment in the *Contract Price*, the *Contractor* shall express and calculate the adjustment in the form of a written quotation with supporting documentation, including documentation and detailed invoicing from *Subcontractors*, and *Suppliers*, acceptable to the *Consultant*, and to include an amount:

(1) representing the net change in *Construction Costs* of the *Work*, taking into account all credits and scope reductions resulting from the change;

(2) for *Overhead Costs* and profit calculated in accordance with paragraph 6.7.3; and,

(3) for *Value Added Taxes*.

.2 Where the scope of *Work* identified by the *Contemplated Change Order* or *Change Directive* involves an adjustment in the *Contract Time*, the *Contractor* shall express the number of *Working Days*, the reason and logic for the adjustment, and all the supporting documentation inclusive of a *Project* schedule identifying the impacted activities, their inter-relationship, and changes to the critical path.

.3 Notwithstanding any other provisions in the General Conditions or Supplementary Conditions of the *Contract*, it is the intention and agreement of the parties that the *Contractor's* submitted adjustment in *Contract Price*, if any, and the adjustment in *Contract Time*, if any, in response to a *Contemplated Change Order* or *Change Directive* shall be all-inclusive of any costs, claims, impacts, and liabilities of the *Contractor* and *Subcontractor*(s) whether known or unknown, direct or indirect, collective or cumulative.

.4 The *Consultant* and *Owner* are entitled to rely on the accuracy, completeness, and all-inclusive nature of the *Contractor*'s submitted adjustment(s), if any, in response to a *Contemplated Change Order* or *Change Directive*. Once a *Change Order* has been issued for the submitted adjustment(s) the *Contractor* shall not be entitled to any further claim or adjustment in the *Contract Price* or *Contract Time* associated, in part or whole, with the respective change.

6.7.3 Where an adjustment to the *Contract Price* and/or *Contract Time* is made for a change carried out by *Change Order* or *Change Directive*, the amount of *Overhead Costs* and profit for the *Contractor* and *Subcontractor* shall be calculated in accordance with the following provisions:

.1 Where a change in the *Work* is performed by the *Contractor's* own forces, *Overhead Costs* and profit shall not exceed an amount equal to 15% of the first $50,000.00 in additional *Construction Costs* and 5% thereafter;

.2 Where a change in the *Work* is performed by a *Subcontractor's* forces:

(1) The *Subcontractor's Construction Costs* for the change in the *Work* shall be all-inclusive to perform the change and be identified separate and apart from any *Value Added Taxes*, *Overhead Costs*, or profit of the *Subcontractor* or *Contractor*.

(2) The *Subcontractor's Overhead Costs* and profit shall not exceed an amount equal to 15% of the first $50,000.00 in additional *Construction Costs* and 5% thereafter; and

(3) The *Contractor's Overhead Costs* and profit shall not exceed an amount equal to 10% of the first $50,000 in additional *Subcontractor Construction Costs* and 5% thereafter;

.3 Where a change in the *Work* is performed both by the *Contractor's* own forces and a *Subcontractor's* forces the *Overhead Costs* and profit shall be calculated separately in accordance with paragraph 6.7.3.1 and 6.7.3.2 as the case may be, as applied proportionately to the total amount of change in *Construction Costs* being done by the *Contractor* and *Subcontractor*."

SC 49. GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

1. Add before "OR TERMINATE THE CONTRACT" in the title of GC 7.1, the following:

   "SUSPEND THE WORK"

2. Delete "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" from subparagraph 7.1.5.3.

3. Delete paragraph 7.1.6 in its entirety.

4. Add new paragraphs 7.1.6, 7.1.7, 7.1.8, 7.1.9 and 7.1.10 as follows:

"7.1.6 In addition to its right to terminate the *Contract* set out herein, the *Owner* may terminate the *Contract* at any time for any other reason and without cause upon giving the *Contractor Notice in Writing* to that effect. In such event, 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*, but in no event shall the *Contractor* be entitled to be compensated for any loss of profit on unperformed portions of the *Work*, or indirect, special, or consequential damages incurred.

7.1.7 The *Owner* may suspend *Work* under the *Contract* at any time for any reason and without cause upon giving the *Contractor Notice in Writing* to that effect. In such event, the *Contractor* shall be entitled to be paid for all *Work* performed to the date of suspension and be compensated for all actual costs incurred arising from the suspension, including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the suspension of the *Work*, but in no event shall the *Contractor* be entitled to be compensated for any indirect, special, or consequential damages incurred. In the event that the suspension continues for more than one hundred and eighty (180) calendar days, the *Contract* shall be deemed to be terminated and the provisions of paragraph 7.1.6 shall apply.

7.1.8 In the case of either a termination of the *Contract* or a suspension of the *Work* under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall use its best commercial efforts to mitigate the financial consequences to the *Owner* arising out of the termination or suspension, as the case may be.

7.1.9 Upon the resumption of the *Work* following a suspension under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* will endeavour to minimize the delay and financial consequences arising out of the suspension.

7.1.10 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 or suspension shall continue after such termination of the *Contract* or suspension of the *Work*."

SC 50. GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

1. Delete “20 *Working Days*” in paragraph 7.2.2 and replace with the following:

   “ninety (90) *Working Days*”

2. Delete paragraph 7.2.3 in its entirety and replace with the following:

   “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 subject to the other terms and conditions of the *Contract* the *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by adjudication, arbitration or court, except where the *Owner* has a bona fide claim for set-off, or

   .2 the *Owner* fails to comply with the requirements of the *Contract* to a substantial degree and the *Consultant*, confirms by written statement to the *Contractor* and the *Owner,* that sufficient cause exists.”

3. Delete paragraph 7.2.4 in its entirety and replace with the following:

   “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 twenty (20) *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* until the default is corrected*,* provided, however, that in the event of such suspension, the provisions of paragraph 7.1.10 shall apply. If the *Contractor’s Notice in Writing* to the *Owner* was given pursuant to paragraph 7.2.3, then, ninety (90) *Working Days* after the delivery of the *Notice in Writing*, the *Contractor* may terminate the *Contract,* provided, however, that in the event of such termination, the provisions of paragraph 7.1.10 shall apply.”

4. Delete paragraph 7.2.5 in its entirety and replace with the following:

   “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 to the date of termination and be compensated for all actual costs incurred arising from the suspension, 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 *Work*, but in no event shall the *Contractor* be entitled to be compensated for any indirect, special or consequential damages incurred.”

SC 51. GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

1. Delete paragraphs 8.3.6, 8.3.7 and 8.3.8 in their entirety.

2. Add new paragraphs 8.3.6 and 8.3.7 as follows:

"8.3.6 When a dispute has not been resolved through negotiation or mediation, within ten (10) *Working Days* after the date of termination of the mediated negotiations under paragraph 8.3.5, either party may give a *Notice in Writing* to the other party and to the *Consultant* inviting the other party to agree to submit the dispute to be finally resolved by arbitration, pursuant to provisions of the *Arbitration Act, 1991*. If the other party wishes to accept the invitation to submit the dispute to arbitration, it shall so indicate by the delivery of a responding *Notice in Writing* within ten (10) *Working Days* of receipt of the invitation. If, within the required times, no invitation is made or, if made, is not accepted, either party may refer the dispute to the courts or to any other form of dispute resolution, including arbitration, which the parties may agree to use.

8.3.7 The determination of a matter by an adjudicator under the *Construction Act* (Ontario) may be submitted to arbitration or the courts or other form of dispute resolution as provided in section 8.3.6 at any time."

SC 52. GC 9.1 PROTECTION OF WORK AND PROPERTY

1. Delete "property adjacent to the *Place of the Work*" in paragraphs 9.1.1 replace with the following:

"property adjacent, in the vicinity of or proximate to the *Place of the Work*"

2. Delete subparagraph 9.1.1.1 in its entirety and replace with the following:

".1 errors in the *Contract Documents* which the *Contractor* could not have reasonably discovered applying the standard of care described in paragraph 3.14.1;"

3. Delete paragraph 9.1.2 in its entirety and replace 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 reasonably apparent from the *Contract Documents*, or that are reasonably apparent from an inspection of the *Place of the Work* exercising the degree of care and skill described in paragraph 3.14.1."

4. Delete "property adjacent to the *Place of the Work*" in paragraphs 9.1.3 and replace with the following:

"property adjacent, in the vicinity of or proximate to the *Place of the Work*"

5. Add new paragraph 9.1.5 as follows:

"9.1.5 With respect to any damage to which paragraph 9.1.4 applies, the *Contractor* shall neither undertake to repair or replace any damage whatsoever to the work of other contractors, or to property adjacent, in the vicinity of or proximate to the *Place of the Work*, nor acknowledge that the same was caused or occasioned by the *Contractor*, without first consulting the *Owner* and receiving written

instructions as to the course of action to be followed from either the *Owner* or the *Consultant*. Where, however, there is danger to life, the environment, or public safety, the *Contractor* shall take such emergency action as it deems necessary to remove the danger."

SC 53. GC 9.2 TOXIC OR HAZARDOUS SUBSTANCES

1. Delete paragraph 9.2.6 in its entirety and replace with the following:

"9.2.6 If the *Owner* and *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, 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 legal and regulatory requirements) 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, 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."*

2. Delete subparagraph 9.2.7.4 in its entirety and replace with the following:

"9.2.7.4 indemnify the *Contractor* from and against claims, demands, losses, costs, damages, actions, suits or proceedings made, suffered or brought by third parties arising out of or resulting from exposure to, or the presence of, toxic or hazardous substances for which the *Contractor* is not responsible under GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES at the *Place of Work*. This obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity set out in GC 13.1 – INDEMNIFICATION or that otherwise exist respecting a person or party described in this paragraph."

3. Delete paragraph 9.2.8 in its entirety and replace with the following:

"9.2.8 If the *Owner* and *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, 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 legal and regulatory requirements) 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, 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 as a result of the delay

.4 indemnify the *Owner* as required by GC 13.1 - INDEMNIFICATION."

SC 54. GC 9.4 CONSTRUCTION SAFETY

1. Delete GC 9.4. in its entirety and replace with the following:

"9.4.1 The *Contractor* shall be solely responsible for construction safety at the *Place of the Work* and for compliance with the rules, regulations, and practices required by the applicable construction health and safety legislation and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the *Work*.

9.4.2 Prior to the commencement of the *Work*, the *Contractor* shall submit to the *Owner*:

.1 documentation setting out the *Contractor's* in-house safety programs; and

.2 a copy of the Notice of Project filed with the Ministry of Labour naming the *Contractor* as "constructor" under the *Occupational Health and Safety Act*.

9.4.3 The *Contractor* shall indemnify, defend and save harmless the *Owner*, its agents, officers, directors, employees, consultants, successors, appointees, and assigns from and against the consequences of any and all safety infractions committed by the *Contractor* under the *Occupational Health and Safety Act*, including the payment of legal fees and disbursements on a solicitor and client basis. Such indemnity shall apply to the extent to which the *Owner* is not covered by insurance, provided that the indemnity contained in this paragraph shall be limited to costs and damages resulting directly from such infractions and shall not extend to any consequential, indirect or special damages.

9.4.4 The *Owner* undertakes to include in its contracts with other contractors and in its instructions to its own forces the requirement that the other contractor or its own forces, as the case may be, comply with the policies and procedures of and the directions and instructions from the *Contractor* with respect to occupational health and safety and related matters. Prior to admission to the *Place of the Work*, the *Contractor* may, as a condition of admission, require any other contractor or the *Owner's* own forces to sign a written acknowledgement in the following form:

Acknowledgement
The undersigned acknowledges that the *Work* it will perform on behalf of the *Owner* requires it to enter a *Place of the Work* which is under the total control of a *Contractor* that has a contract with the *Owner*, pursuant to which the

Contractor has assumed overall responsibility for compliance with all aspects of the applicable health and safety legislation, including all the responsibilities of the "constructor" under the *Occupational Health and Safety Act*, as well as responsibility to co-ordinate and schedule the activities of our *Work* with the *Work* of the *Contractor* under its contract. The undersigned agrees to comply with the *Contractor*'s directions and instructions with respect to health, safety, co-ordination, and scheduling and acknowledges that its failure to do so will be cause for termination of employment or of the undersigned's contract with the *Owner,* as the case may be. The undersigned also agrees to have the *Contractor* named as an additional insured on any commercial general liability insurance policy, where such insurance is required.

9.4.5 Without limiting any of the foregoing, prior to commencement of the *Work*, the *Contractor* shall have both a written occupational health and safety policy and program to implement that policy, and that all of its employees, *Subcontractors* and any other persons performing the *Work* shall be appropriately trained, licensed and certified, as required to perform the *Work*.

9.4.6 The *Contractor* and *Subcontractors* shall comply with the safety by-laws of the *Owner*, the *Employment Standards Act, Occupational Health and Safety Act* and all regulations thereunder, any other legislation governing construction or workplace safety, and all instructions issued by the *Consultant* or any inspector appointed by the Province of Ontario or City of Hamilton.

9.4.7 The *Contractor* shall be responsible for keeping the work free from trespassers and for protection of the work and the public from any loss or injury from commencement of the work to *Substantial Performance of the Work*.

9.4.8 The *Contractor* shall comply with all applicable occupational health and safety requirements in force during the time when *Work* is being carried out, and shall provide at the *Place of the Work*, such equipment and medical facilities as are necessary to furnish first aid to anyone who may be injured in connection with the *Work*.

9.4.9 Before commencing with any *Work*, the *Contractor*, the *Consultant* and the *Owner's* representative shall meet at the *Place of the Work*, and establish safe routes and routines for material deliveries, material storage locations, construction office location, and all other aspects of the execution of all *Work*.

9.4.10 The *Contractor* shall erect and maintain during construction, a dependable temporary fence, barricades, warning lights, and signage around the perimeter of the *Place of the Work*, all hazardous areas and excavations, and the *Consultant* may give reasonable directions to the *Contractor* as to the type and extent of the fence, barriers, warning lights, and signage needed.

9.4.11 The *Contractor* shall, at its own expense, shore up or otherwise securely support or protect any buildings, walls, fences, pavement, boulevards or other structures at the *Place of the Work*, and on the adjoining properties which may be endangered or which may cause injury during the *Work*, and in case of damage,

disturbance or injuries to any such structures during and attributable, whether directly or indirectly, to any work under the *Contract*, or to any extra work entering into the *Contract*, the *Contractor* shall at its own expense, repair, rebuild or other wise make good all damage, injuries or disturbance to said structures and put all such structures in a condition the same as, or equal to, that existing previous to its beginning that work."

SC 55 GC 9.5 MOULD

1. Add to the end of subparagraph 9.5.2.3, the following:

"and incurred as a result of the delay"

2. Delete subparagraph 9.5.3.4 in its entirety and replace with the following:

"9.5.3.4 indemnify the *Contractor* from and against claims, demands, losses, costs, damages, actions, suits or proceedings made, suffered or brought by third parties arising out of or resulting from exposure to, or the presence of, mould for which the *Contractor* is not responsible under GC 9.5 – MOULD at the *Place of Work.* This obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity set out in GC 13.1 – INDEMNIFICATION or that otherwise exist respecting a person or party described in this paragraph."

SC 56 GC 10.1 TAXES AND DUTIES

1. Add to the end of paragraph GC 10.1.2 the following:

"The *Contractor* must prove to the satisfaction of the *Owner* that the *Contractor* will not benefit in any way by reason of any increase to the *Contract Price*."

2. Add new paragraph 10.1.3 as follows:

"10.1.3 Where the *Owner* is entitled to an exemption or a recovery of sales taxes, customs duties, excise taxes or *Value Added Taxes* applicable to the *Contract*, the *Contractor* shall, at the request of the *Owner*, assist with application for any exemption, recovery or refund of all such taxes and duties and all amounts recovered or exemptions obtained shall be for the sole benefit of the *Owner*. The *Contractor* agrees to endorse over to the *Owner* any cheques received from the federal or provincial governments, or any other taxing authority, as may be required to give effect to this paragraph."

SC 57 GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

1. Add to the beginning of paragraph 10.2.5, the following:

"Subject to paragraph 3.4.1,"

SC 58 GC 10.3 PATENT FEES

1. Add before "hold the *Owner* harmless" in the second sentence of paragraph 10.3.1, the following:

   "indemnify and"

2. Add after "which was supplied to the *Contractor*" in paragraph 10.3.2, the following:

   "by the *Owne*r"

SC 59 GC 10.4 WORKERS' COMPENSATION

1. Add after the words "Prior to commencing the *Work*," in the first line of paragraph 10.4.1, the following:

   "and upon execution of the Agreement, again with each application for progress payment,"

2. Add new paragraph 10.4.2 as follows:

   "The *Contractor* shall ensure that each *Subcontractor* complies with the workers' compensation legislation at the *Place of the Work.* 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*."

SC 60 GC 11.1 INSURANCE

1. Delete GC 11.1 INSURANCE in its entirety and replace with the following:

"GC 11.1 INSURANCE

11.1.1 The *Contractor* shall obtain and maintain at its own expense, including the cost of any applicable deductible, the following policies of insurance.

.1 Commercial General Liability Insurance, written on IBC Form 2100 or its equivalent, including but not limited to bodily and personal injury liability, property damage, products liability, completed operations liability, owners & contractors protective liability, blanket contractual liability, premises liability, and contingent employer's liability coverage, having an inclusive limit of not less than $5,000,000 per occurrence. If a policy has an aggregate limit, the amount of the aggregate shall be double the required per occurrence limit. Coverage shall be included for injury/loss/damage, due to pollution arising from "hostile fires". To achieve the desired limit, Umbrella or Excess liability insurance may be used. Coverage shall be subject to the following:

(1) where the *Work* involves one or more of the following activities:

(i) the use of explosives for blasting;

(ii) vibration from pile driving or caisson work;

(iii) the removal or weakening of support of any property, building or land whether such support be natural or otherwise,

explosion, collapse and underground ("XCU") coverages shall be added by endorsement to the policy and noted on the certificate of insurance;

(2) where the *Work* provides for or contemplates the handling of asbestos, coverage shall not contain an asbestos exclusion and same shall be noted on the certificate of insurance. Alternatively, coverage may be provided under Contractors Pollution Liability Insurance providing coverage in an amount of not less than $1,000,000 per claim. Such Contractors Pollution Liability Insurance coverage shall remain in effect for 12 months following the completion of the *Work*.

(3) the policy shall include coverage for pollution from "hostile fires";

(4) unless otherwise approved by the *Owner*, the *Contractor's* deductible on the Commercial General Liability policy and, if applicable, Contractors Pollution Liability Insurance shall be not more than $100,000; and

(5) the insurance coverage shall remain in effect throughout the time that the *Contract* is in effect, including the warranty period.

.2 Standard Form Automobile Liability Insurance that complies with all requirements of the current legislation of the Province of Ontario, having an inclusive limit of not less than $5,000,000 per occurrence for third party liability, in respect of the use or operation of vehicles owned, operated or leased by the *Contractor* for the performance of the *Work* under the *Contract*. The insurance coverage shall remain in effect throughout the time that the *Contract* is in effect, including the warranty period. To achieve the desired limit, Umbrella or Excess liability insurance may be used;

.3 Non-Owned Automobile Liability Insurance in standard form having an inclusive limit of not less than $1,000,000 per occurrence, in respect of vehicles not owned by the *Contractor*, that are used or operated on its behalf for the performance of the *Work* under the *Contract.* The insurance coverage shall remain in effect throughout the time that the *Contract* is in effect, including the warranty period. To achieve the desired limit, Umbrella or Excess liability insurance may be used;

.4 Builders Risk Insurance which covers the *Place of Work* for the full amount of the *Contract Price* plus the full value of any optional features or other options that the *Owner* elects to order (but the *Owner* may require insurance up to the amount of the replacement cost of any building or structure in, on, or upon which any *Work* is to be done under the *Contract*, where in the reasonable opinion of the *Owner* there is a sufficient risk of damage to the same). Such policy shall:

(1) apply to all risks of direct loss or damage (including theft and sinkhole) subject to the actual policy form;

(2) unless otherwise directed in writing by the *Owner*, or stipulated elsewhere herein, be in force and be maintained from the commencement date of the *Contract* until the day of issue of the certificate of *Substantial Performance of the Work;*

(3) apply to all *Products*, labour, equipment and supplies of every nature, the property of the *Owner* or *Contractor* or for which the *Owner* or *Contractor* may have assumed responsibility (whether on site or in

transit), that is to be used in or pertaining to site preparation, and the erection, fabrication, construction, reconstruction, re-modeling or repair of any building, structure, other fixture or thing;

(4) include the installation, testing and any subsequent use of machinery and equipment, including boilers, pressure vessels or vessels under vacuum;

(5) include damage to the *Work* caused by an accident to or the explosion of any boiler or other pressure vessel or equipment forming part of the *Work*;

(6) include off-site storage, transit and installation risks;

(7) include flood and earthquake insurance;

(8) include coverage for loss of income, extra expense and/or expediting expense if such exposures exist;

(9) be subject to a waiver of coinsurance;

(10) permit use and occupancy of the *Project*, or any part thereof, where such use and occupancy is for the purposes for which the *Project* is intended upon completion;

(11) be endorsed to cover the interest of the *Owner* ;

(12) unless otherwise approved by the *Owner*, provide for a deductible of not more than $25,000; and

(13) provide that in the case of a loss or damage, payment shall be made to the *Owner* as their interest may appear. The *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurer. 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 a reasonable extension of *Contract Time.*

.5 Property Insurance with respect to loss or damage (including fire, theft, burglary, etc.) of the *Contractor's* own property and property in its care, custody and control, including its equipment, tools and stock, used in connection with the *Contract*.

11.1.2 All polices of insurance required under paragraph 11.1.1 shall,

.1 be recorded as being a primary policy and shall be in a form and issued by an insurance company satisfactory to the *Owner*, that is licensed to carry on business in Ontario;

.2 be maintained continuously during the course of carrying out the *Work*, or for such period of time as may be required after completion of the *Work* as deemed necessary by the *Owner*;

.3 except in the case of standard form automobile liability insurance and non-owned automobile liability insurance, include the *Owner* named as an additional insured, to the extent of the *Contractor's* obligations to the *Owner* under the *Contract Documents*;

.4 contain cross liability and severability of interest provisions, as may be applicable;

.5 preclude subrogation claims against the *Owner* and any other person insured under the policy; and

.6 provide that at least 30 days prior written notice (15 days in the case of standard form automobile liability insurance, and 10 days in the event of non-payment of premiums) shall be given to the *Owner* by the insurer before the insurer or *Contractor* takes any steps to cancel, terminate, fail to renew, amend or otherwise change or modify the insurance or any part thereof.

11.1.3 The *Contractor* shall be responsible for deductible amounts under all of the policies of insurance required under paragraph 11.1.1.

11.1.4 The *Owner* reserves the right to require the *Contractor* to purchase such additional insurance coverage as the *Owner* may reasonably require. The *Owner* reserves the right to request such higher limits of insurance or otherwise alter the types of coverage requirements due to material or significant change arising from such matters as the nature of the work, agreement value, industry standards, and availability of insurance, as the *Owner* may reasonably require from time to time. Where such a right is exercised by the *Owner,* the *Owner* will compensate the *Contractor* for any resulting increase in applicable insurance premiums only where the *Contractor* can establish to the satisfaction of the *Owner*, acting reasonably, that such increase in applicable insurance premiums for the insurance required pursuant to the *Contract* does not result from the actions or omissions, negligence, claims history or reassessment by the insurer of the insurable risk posed by the *Contractor*.

11.1.5 Any insurance coverage acquired under the *Contract* shall in no manner discharge, restrict or limit the liabilities assumed by the *Contractor* under the *Contract*. The dollar limit of insurance coverage shall not be limited to the *Contract Price*.

11.1.6 The *Contractor* shall pay all premiums on the policies as they become due provided that the *Owner* may pay premiums as they become due and deduct the amount thereof from monies due from the *Owner* to the *Contractor* should the *Contractor* fail to do so.

11.1.7 The *Contractor* shall deposit with the *Owner* such evidence of its insurance policies required under paragraph 11.1.1 at the time of execution of the Agreement and thereafter during the term of the *Contract*, no later than 20 *Working Days* prior to the renewal date of each applicable policy, a certificate of insurance originally signed by an authorized insurance representative confirming thereon relevant coverage information including but not limited to the *Contract* name and description, name of insurer, name of insurance broker, name of insured, name of additional insureds as may be applicable, commencement and expiry dates of coverage, dollar limits of coverage, deductible levels as may be applicable, cancellation/termination provisions; or at the *Owner's* election, a certified copy of the insurance policy or policies required under paragraph 11.1.1. The *Contractor* shall ensure that the certificate holder is identified on each certificate of insurance as the *Owner* at 71 Main Street West, Hamilton, Ontario L8P 4Y5, or at such other address as the

Owner may advise in writing, and that all certificates, cancellation, nonrenewal or adverse change notices are mailed to that address.

11.1.8 The *Contractor* shall not do or omit to do anything that would impair or invalidate the insurance policies.

11.1.9 Delivery to and examination or approval by the *Owner* of any certificates of insurance or policies of insurance or other evidence of insurance does not relieve the *Contractor* of any of its indemnification or insurance obligations under the *Contract*. The *Owner* is not under a duty either to ascertain the existence of or to examine such certificates of insurance or policies of insurance, nor to advise the *Contractor* in the event such insurance coverage is not in compliance with the requirements set out in the *Contract*.

11.1.10 The *Contractor* shall promptly investigate claims reported to the *Contractor* by a third party or by the *Owner*. The *Contractor* shall make contact with the claimant within forty-eight (48) hours of the *Contractor's* receipt of notice of a claim. The *Contractor* shall initiate an investigation of the claim immediately upon notice, and advise the claimant by letter of its position regarding resolution of the claim within twenty (20) *Working Days* of the notice. The *Contractor* shall include in its letter of resolution the reasons for its position. Failing acceptance of the resolution by the claimant of the proposed resolution, the *Contractor* agrees to report the claim to its insurer for further review and response to the claimant. Should the *Contractor* fail to follow this procedure, the *Owner* may investigate and resolve such claims, and offset the resultant costs against any monies due to the *Contractor*, from time to time, under the *Contract."*

SC 61 GC 11.2 CONTRACT SECURITY

1. Add new general condition GC 11.2 CONTRACT SECURITY

"GC 11.2 CONTRACT SECURITY

11.2.1 The *Contractor* shall, upon execution of the Agreement, provide to the *Owner*:

.1 a performance bond , in an amount equal to 50% of the *Contract Price*, covering the performance of the *Contract,* including the warranty period and the *Contractor's* requirements with respect to the correction of deficiencies, excluding all extended warranties; and

.2 a labour and material payment bond, in the form set out in the *Contract Documents*, in an amount equal to 50% of the *Contract Price* covering payment for labour, *Products*, or both.

11.2.2 The bonds referred to in paragraph 11.2.1 shall be issued by a duly licensed surety company authorized to transact the business of suretyship in the Province of Ontario, using the prescribed forms set out in the *Construction Act*, and shall be maintained in good standing until the fulfillment of the *Contract,* including the warranty period."

SC 62 GC 11.3 CERTIFICATE OF STATUS

1. Add new general condition GC 11.3 CERTIFICATE OF STATUS as follows:

"GC 11.3 CERTIFICATE OF STATUS

11.3.1 The *Contractor* shall, upon execution of the Agreement, provide to the *Owner* a certificate of status from the Companies and Personal Property Security Branch of the Ontario Ministry of Government Services, or other ministry acceptable to the *Owner,* which indicates that the *Contractor* is an existing corporation and has not been dissolved."

SC 63 GC 12.1 READY-FOR-TAKEOVER

1. Delete subparagraphs 12.1.1.2 through to 12.1.1.8.

2. Delete subparagraph 12.1.2 in its entirety.

3. Add after the words "the *Work* is *Ready-for-Takeover*," in the subparagraph 12.1.3, "and where the *Consultant* requests"

4. Delete the word "comprehensive" in subparagraph 12.1.3 and replace with "updated".

SC 64 GC 12.2 EARLY OCCUPANCY BY THE OWNER

1. Delete GC 12.2 EARLY OCCUPANCY BY THE OWNER in its entirety.

SC 65 GC 12.3 WARRANTY

1. Delete paragraph 12.3.1 in its entirety and replace with the following:

"Except for extended warranties as described in paragraph 12.3.6, the warranty period under the *Contract* is one year from the date when *Substantial Performance of the Work* has been attained, unless the *Contract Documents* otherwise provide."

2. Add to the beginning of paragraph 12.3.2, the following:

"Subject to paragraph 3.14.1,"

3. Delete "one year" from paragraph 12.3.3.

4. Delete "one year" from paragraph 12.3.4.

5. Delete "one year warranty period as described in paragraph 12.3.1" from paragraph 12.3.6 and replace with the following:

"warranty period"

6. Add new paragraphs 12.3.7, 12.3.8, 12.3.9, 12.3.10, 12.3.11, 12.3.12, 12.3.13, 12.3.14, 12.3.15, 12.3.16, 12.3.17 and 12.3.18 as follows:

"12.3.7 Any material or equipment requiring excessive servicing during the warranty period (or free maintenance period, if applicable) shall be considered defective and the warranty shall be deemed to take effect from the time that the defect has been corrected so as to cause excessive servicing to terminate. Where an extended warranty is provided beyond the warranty period, and any material or equipment requires excessive servicing during the first fifteen percent (15%) of the extended warranty period (or free maintenance period, if applicable) the material or equipment shall be considered defective and the extended warranty shall be deemed to take effect from the time that the defect has been corrected so as to cause excessive servicing to terminate.

12.3.8 The final payment certificate shall not relieve the *Contactor* from its responsibility under this GC 12.3 – WARRANTY.

12.3.9 Following *Substantial Performance of the Work*, and without limiting the *Contractor's* warranty under this GC 12.3 WARRANTY, the *Contractor* shall assign to the *Owner*, to the extent assignable the benefit of all warranties and guarantees relating to the *Work*. The assignment shall expressly reserve the right of the *Contractor* to make any claims under such warranties and guarantees and such assignment shall in no way prejudice any rights of or benefits accruing to the *Contractor* pursuant to such warranties and guarantees.

12.3.10 The *Contractor* shall provide to the *Owne*r for the duration of the warranty period, a maintenance security the value of which shall be derived from the following table:

CONTRACT PRICE		**VALUE OF MAINTENANCE SECURITY $**
FROM $	**TO$**	
Less than $100,000.00		4 % of final *Contract Price*
$100,000.00	$499,999.99	$4,000.00 on first $100,000.00 + 3.0% on next $399,999.99
$500,000.00	$999,999.99	$16,000.00 on first $500,000.00 + 2.4% on next $499,999.99
$1,000,000.00	$1,999,999.99	$28,000.00 on first $1,000,000.00 + 2.2% on next $999,999.99
$2,000,000.00	$3,999,999.99	$50,000.00 on first $2,000,000.00 + 2.0% on next $1,999,999.99
$4,000,000.00	$5,999,999.99	$90,000.00 on first $4,000,000.00 + 1.8% on next $1,999,999.99
$6,000,000.00	$9,999,999.99	$126,000.00 on first $6,000,000.00 + 1.5% on next $3,999,999.99
$10,000,000.00 or Greater		$186,000.00 on first $10,000,000.00 + 1%

	on balance

12.3.11 The maintenance security, which is at no time a part of the statutory holdback, shall be retained by the *Owner* in increments from monies that would otherwise be payable to the *Contractor*, commencing during the latter part of the period of construction, so that by the date of *Substantial Performance of the Work* the full value of the required maintenance security has been retained.

12.3.12 Except as otherwise provided hereunder, the maintenance security, less any deductions made therefrom as provided for in the *Contract*, shall be paid to the *Contractor* following the issuance by the *Consultant* of a final certificate at the end of the warranty period, provided that all defects and deficiencies in the *Work* have been corrected by the *Contractor*. No interest shall be payable to the *Contractor* on such funds withheld in accordance with 12.3.10.

12.3.13 The *Contractor* may apply in writing to the *Owner* at the time of *Substantial Performance of the Work* to substitute for the monies retained as the maintenance security an alternative maintenance security of equivalent or greater value comprising:

.1 one or more irrevocable letters of credit, or

.2 another readily negotiable security.

12.3.14 Acceptance of any such alternative shall be at the discretion of the *Owner.*

12.3.15 Following receipt and acceptance of any such alternative, the *Owner* shall release to the *Contractor* the monies previously retained for maintenance security purposes.

12.3.16 The *Owner* may, in its discretion, allow the total maintenance security to be made up in part of monies retained under the *Contract* and in part of an alternative maintenance security as indicated in paragraph 12.3.13 above provided that the total value of such parts, as determined by the *Owner*, shall be not less than the required value as derived from the table set out in paragraph 12.3.10 above.

12.3.17 Such alternative maintenance security or the monies derived therefrom, less any deductions made as provided for in the *Contract*, shall be released to the *Contractor* following the issuance by the *Consultant* of the final certificate at the end of the warranty period.

12.3.18 The *Contractor* will be responsible for extended warranty periods on equipment and materials as outlined in the *Specifications*. Warranties shall be provided for all inclusive replacement including all costs for labour and materials upon failure. Warranties shall be provided irrespective of the standard manufacturers, *Suppliers* and vendors' warranties and are in addition to the standard construction warranty of one year for general construction, materials and equipment."

SC 66 GC 13.1 INDEMNIFICATION

1. Delete GC 13.1 INDEMNIFICATION in its entirety and replace with the following:

"GC 13.1 INDEMNIFICATION

13.1.1 The *Contractor* shall indemnify, defend, and hold the *Owner*, including its elected officials, officers, employees, agents, affiliates and representatives (collectively referred to as the "Indemnified Party") harmless against any and all claims, demands, costs (including legal costs on a substantial indemnity basis), penalties, fines, fees, royalties, damages (including indirect, special, remote, and/or consequential damages) and causes of action, including, without limitation, proprietary or personal injury (including death) that arise from, either directly or indirectly, or relate to,

(a) the *Contractor*, its officials, directors, officers, employees, agents, affiliates, partners (general or limited), joint venturers, contractors, *Subcontractors*, and other representatives (collectively referred to as the "Indemnifying Party"), under this *Contract*,

(i) negligently carrying out any obligation to which it is subject,
(ii) failing to carry out any obligation to which it is subject,
(iii) negligently exercising any right to which it is entitled, or,
(iv) exercising any right to which it is entitled in a manner which is inconsistent with the terms and conditions of this *Contract*,

or any combination thereof, except to the extent that the same are caused by the negligence or deliberate wrong-doing of the Indemnified Party, or

(b) any patent, trademark, copyright infringement or other breach of any intellectual property right of any person, for which the Indemnifying Party is responsible.

13.1.2 The *Owner* shall notify the *Contractor* upon receipt of any such claim or demand that it receives. No settlement shall be made nor consent to judgment given without prior written approval of *Contractor* and its insurers, which approval shall not be unreasonably withheld.

13.1.3 The rights to indemnity contained herein shall survive the early termination or expiry of this *Contract*.

13.1.4 The *Owner* may enforce the rights of indemnity conferred on any Indemnified Party under this GC 13.1 on their behalf and to the same extent as if they were parties to this *Contract*.

13.1.5 The rights to indemnity provided for in this GC 13.1 shall be deemed to be in addition to any rights with respect to insurance in favour of the Indemnified Party provided in this *Contract*."

SC 67 GC 13.2 WAIVER OF CLAIMS

1. Delete GC 13.2 WAIVER OF CLAIMS in its entirety.

SC 68 GC 14 MISCELLANEOUS

1. Add new PART 14 MISCELLANEOUS as follows:

"PART 14 MISCELLANEOUS
GC 14.1 OWNERSHIP OF MATERIALS

14.1.1 All *Work* and *Products* delivered to the *Place of the Work* by the *Contractor* shall be the property of the *Owner*. The *Contractor* shall remove all surplus or rejected materials when notified in writing to do so by the *Consultant*.

GC 14.2 REVIEW BY OWNER AND REVIEW BY CONSULTANT

14.2.1 Neither the *Owner's* and/or *Consultant's* receipt, review or approval of any documents of the *Work* nor the failure of the *Owner* and/or *Consultant's* to provide comments shall limit, waive or diminish the *Contractor's* obligations, responsibilities, duties or liabilities under the *Contract*. The review or approval by the *Owner* and/or *Consultant* is intended only to ascertain that the document or the performance of the *Contractor's* duties, liabilities, responsibilities, or obligations under the *Contract* including, without limitation, the *Work* generally meets the intention of the *Contract* and is not an assurance or confirmation of the adequacy, quality, fitness, suitability or correctness of the *Contractor's* obligations, responsibilities, duties and liabilities under the *Contract* including without limitation, the *Work*, for which the *Contactor* is solely responsible in accordance with the *Contract*.

GC 14.3 USE AND/OR OCCUPATION OF COMPLETED PORTIONS OF THE WORK

14.3.1 Upon the *Owners'* request, the *Owner* shall, at any time or times, have the right of occupying and/or using any part of parts of the *Work* (including, without limitation, for the purposes of installing and testing fittings and equipment), whether partially performed or entirely complete, or whether completed on schedule or not, before the completion of the *Work*.

14.3.2 In the event the *Owner* desires to exercise the privilege of occupancy and/or use of the *Work* as provided above, the *Contractor* shall co-operate with the *Owner* throughout in making available for the *Owners'* use such building services, as heating, ventilation, cooling, water, lighting, and telephone for the space or spaces to be occupied and/or used and if the equipment required to furnish such services is not entirely completed at the time the *Owner* desires to occupy and/or use the aforesaid space or spaces, the *Contractor* shall make every reasonable effort to complete same as soon as possible to the extent that the necessary equipment can be put into operation and use and any extra costs beyond that originally required to complete the *Work* arising from such early occupancy and/or use shall be borne by the *Owner.*

14.3.3 In the event that the *Owner* exercises the privilege of occupancy and/or use of the *Work* as provided above, it agrees to do so, as not to materially interfere with the respective work of the *Contractor*, *Subcontractors* or *Suppliers* and under the understanding that the *Owner* will be occupying premises within a construction site which will require compliance with all normal construction site requirements including, without limitation, health and safety requirements.

14.3.4 It shall be understood, however, that the *Owner's* occupancy and/or use of such space or spaces of the *Work* shall not constitute the *Owner's* acceptance of any *Work*, material or equipment which are not in accordance with the requirements of the *Contract Documents*, nor affect the warranty period under the *Contract* nor relieve the *Contractor* from his obligations, duties, responsibilities and liabilities to complete the *Work*, nor for responsibility for loss or damage due to or arising out of defects in, or malfunctioning of, any *Work*, material or equipment, nor from any other unfulfilled duties, liabilities, obligation or responsibilities under the *Contract* nor from any other duty, liability obligation or responsibility under the *Contract* including, without limitation, the *Contractors'* warranty obligation. If however, damage results from any act by the *Owner*, the *Owner* shall assume its share of the responsibility for such damage.

GC 14.4 NON-INTERFERENCE

14.4.1 The *Contractor* acknowledges that the *Place of the Work* is and will continue to be occupied by the *Owner* and the *Owner* will continue to carry out its normal operations at the *Place of the Work*. The *Contractor* agrees to perform the *Work* in the least intrusive manner possible. Without limiting the generality of the foregoing, the *Contractor* acknowledges and agrees that it shall carry out its duties, responsibilities, and obligations under the *Contract* in such a manner so as not to disrupt or interfere with any of the *Owner's* or any third party's existing facilities and ongoing operations or activities or other operations located in the area adjacent to, in the vicinity of or proximate to the *Place of the Work*.

GC 14.5 LIQUIDATED DAMAGES

14.5.1 It is expressly agreed by the parties that if the date of *Substantial Performance of the Work* occurs later than the *Substantial Performance Date,* the *Contractor* shall pay to the *Owner* liquidated damages calculated as ONE THOUSAND DOLLARS ($1,000.00) for each *Working Day* that *Substantial Performance of the Work* extends beyond the *Substantial Performance Date.*

14.5.2 It is expressly agreed that it is difficult to calculate the damages which would result from the *Contractor*'s failure to attain *Substantial Performance of the Work* by the *Substantial Performance Date* and the parties agree that the liquidated damages are not intended to be penalties but rather represent the parties' best estimate of damages resulting from the delay.

14.5.3 The *Owner* may deduct any amount due under this paragraph from any monies that may be due or payable to the *Contractor* on any account whatsoever. The liquidated damages payable under this paragraph are in addition to and without prejudice to any other remedy, action or other right that may be available to the *Owner*.

GC 14.6 CONTRACTOR DISCHARGE OF LIABILITIES

14.6.1 In addition to the obligations assumed by the *Contractor* pursuant to General Condition 3.6 – SUBCONTRACTORS AND SUPPLIERS, the *Contractor* agrees to discharge all liabilities incurred by it for labour, materials, services, *Subcontractors* and *Products*, used or reasonably required for use in the performance of the *Work*, except for amounts withheld by reason of legitimate dispute which have been identified to the party or parties, from whom payment has been withheld.

GC 14.7 CONTRACTOR EVALUATION

14.7.1 In accordance with the *Owner's* policy for vendor performance evaluation, the *Owner* will evaluate the performance of the *Contractor* with respect to the *Work* using the following criteria:

.1 general responsiveness of the work relationship;
.2 conformity of the work done, materials supplied and provision of services with the description of *Project* and *Specifications*;
.3 general dependability and quality of all work done and any goods or services supplied;
.4 timely performance;
.5 general conformity with the reasonable expectations of the *Owner* under the terms of the *Contract* in their entirety;
.6 supervision of subcontractors and the maintenance of an orderly, neat and secure job site;
.7 accuracy of carrying out instructions.

14.7.2 Where a performance review is conducted at *Final Completion of the Work*, the *Contractor's* performance shall be ranked by the *Owner* at one of the following standards:

.1 Unacceptable (performance well below the general standard); or
.2 Satisfactory (performance in accordance of general standard).

14.7.3 Where at a performance review carried out prior to the completion of the *Contract*, one or more criteria of assessment are ranked as unacceptable:

.1 the parties shall agree at the time of the conduct of the review or within ten (10) *Working Days* thereafter, on the measures to be taken by the *Contractor* during the ensuing *Contract* review period to improve its performance to at least a good standard;
.2 within ten (10) *Working Days* of agreeing on those measures, the *Contractor* shall confirm in writing that the measures in question have been implemented.

14.7.4 Where the *Contractor* fails or refuses to implement measures as provided in paragraph 14.7.3, it shall be deemed to be in default under the *Contract*, and the *Owner* may take such remedies as provided for in the *Contract Documents* or are otherwise available at law or in equity.

14.7.5 Where the unsatisfactory performance of the *Contractor* is not corrected as required under this section, that performance may be taken into account by the *Owner* with respect to the award of any future contract to the *Contractor*.

GC 14.8 RECORDS/DAILY REPORTS/DAILY LOGS

14.8.1 The *Contractor* shall maintain and keep accurate *Project* records (which means all tangible records, documents, computer printouts, electronic information, books, plans, *Drawings*, *Specifications*, accounts or other information relating to the *Work*) in its head office in accordance with requirements of *Applicable Laws*, but in any event for not less than four (4) years from *Substantial Performance of the Work* or until all claims have been settled. During this time, the *Contractor* shall allow the *Owner* access to the *Project* records during normal business hours upon the giving of reasonable notice. The *Contractor* shall ensure that equivalent provisions to those provided herein are made in each subcontract and shall require the *Subcontractor*s and *Suppliers* to incorporate them into every level of contract thereunder for any part of the *Work*.

GC 14.9 ONTARIANS WITH DISABILITIES ACT, 2001 (ODA) AND THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT, 2005 (AODA)

14.9.1 The *Contractor* shall ensure that all of its employees, agents, volunteers and any *Subcontractors* comply with all applicable accessibility laws, regulations and by-laws, including but not limited to the Ontarians with Disabilities Act, 2001 (ODA), the Accessibility for Ontarians with Disabilities Act, 2005 (AODA), Ontario Regulation 429/07 (Accessibility Standards for Customer Service) and Ontario Regulation 191/11 (Integrated Accessibility Standards), during the term of the *Contract*.

14.9.2 Without limiting the generality of the foregoing, the *Contractor* shall ensure that all of its employees, agents, volunteers and any *Subcontractors* who, as part of the *Contract*:

(a) deal with members of the public or other third parties, or
(b) participate in developing policies, practices and procedures governing the provision of goods or services to members of the public or other third parties,

receive training about the provision of its goods or services to persons with disabilities. The *Contractor* shall ensure that such training includes, without limitation, a review of the purposes of the AODA and the requirements of Ontario Regulation 429/07.

14.9.3 Prior to commencing the *Work*, the *Contractor* shall provide a Statement of Acknowledgement to the City of Hamilton that it has read and understands the City of Hamilton's AODA Integrated Accessibility Standards and Customer Service Standard Handbook; that it has provided the training required by said Handbook; and that it will comply with the requirements of said Handbook and applicable accessibility laws, regulations and by-laws.

14.9.4 The *Owner* and the City of Hamilton reserve the right to inspect the *Contractor's* training records relating to Ontario Regulation 429/07 and Ontario Regulation 191/11, which must describe its training policy and summarize the training, including to whom the training has been given and when the training was given. The *Owner* and the City of Hamilton also reserve the right to require the *Contractor* to amend its training policies, practices and procedures if the *Owner* or the City of Hamilton deems the training is not compliant with the requirements of Ontario Regulation 429/07 and Ontario Regulation 191/11.

See City of Hamilton's AODA Integrated Accessibility Standards and Customer Service Standard Handbook at:

https://www.hamilton.ca/people-programs/equity-diversity-inclusion/accessibility-services/accessibility-guidelines-policies#policies-procedures

GC 14.10 SET-OFF

14.10.1 The parties agree that the *Owner* has the contractual right to set-off against any amounts owing by the *Owner* to the *Contractor* under this *Contract*, any amount owed to the *Owner* by the *Contractor*, whether such amount arises from this *Contract* or under any other contract between the *Owner* and the *Contractor*, irrespective of whether or not those contracts are related or arise at equity or law. This right of set-off shall be subject to the Construction Act, as applicable.

14.10.2 The costs to the *Owner* of sending or publishing any notice or document required by the Construction Act shall constitute damages to the *Owner* and may be retained by the *Owner* in accordance with its set-off rights."

Project Specific Supplementary Conditions to Contract CCDC 2-2020
Dated: June 20, 2023

These Project Specific Supplementary Conditions presuppose the use of the Standard Construction Document CCDC 2-2020 Stipulated Price Contract, English version. These "Project Specific Supplementary Conditions" void, supersede or amend the "Agreement", "Definitions", "General Conditions" and "Supplementary Conditions" as hereinafter provided, as the case may be.

GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT

Where a General Condition or paragraph of the General Conditions of the Stipulated Price Contract is deleted by these Project Specific Supplementary Conditions, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, and the numbering of the deleted item will be retained, unused, unless noted otherwise.

PSSC 1. GC 3.4 CONSTRUCTION SCHEDULE

1. Add new paragraph 3.4.11 to SC19 of the Supplementary Conditions as follows:

   "3.4.11 The *Work* under this *Contract* must achieve *Substantial Performance of the Work* by **October 17, 2025**".

PSSC 2. GC 3.8 SHOP DRAWINGS

1. Add after "SHOP DRAWINGS" in the title of GC 3.8, the following:

   "AND OTHER SUBMITTALS"

2. Add new paragraph 3.8.13 as follows:

   "3.8.13 As the *Work* progresses, the *Contractor* shall keep a complete and accurate record of all changes or deviations from the *Contract Documents* and *Shop Drawings*, indicating the *Work* as actually installed. At the completion of the *Work*, the *Contractor* shall certify by endorsement thereof, that each of the revised prints of the *Drawings* and *Specifications* are complete and accurate. Prior to the *Contractor*'s application for final payment, the record *Drawings* and *Specifications*, arranged in proper order, indexed and endorsed, and in the following form, shall be delivered to the *Owner*, namely:
   .1 three (3) complete sets of reproducible final versions of the *As-Built Drawings*; and
   .2 three (3) copies of the final versions of the *As-Built Drawings* in digital format in both AutoCAD and PDF formats (latest version of software)."

PSSC 3. GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

1. Delete paragraph 5.4.3 in its entirety and replace with the following:

   "5.4.3 Prior to the issuance of the certificate of *Substantial Performance of the Work*, the *Contractor*, in consultation with the *Consultant*, shall establish reasonable dates for finishing the *Work* and correcting deficiencies."

2. Add new paragraphs 5.4.7, 5.4.8, 5.4.9, 5.4.10.and 5.4.11 as follows:

   "5.4.7 Within seven (7) calendar days of receiving a copy of the certificate of *Substantial Performance of the Work* signed by the *Consultant*, the *Contractor* shall publish a copy of the certificate in accordance with the *Construction Act*) and shall provide to the *Consultant* and the *Owner* the date of publication and the name of the construction trade newspaper in which

the publication occurred. If the *Contractor* fails to comply with this provision, the *Owner* may publish a copy of the certificate and charge the *Contractor* with the costs so incurred.

5.4.8 In addition to the prerequisites identified in paragraph 5.4.2, prior to submitting its written application for *Substantial Performance of the Work*, the *Contractor* shall submit to the *Consultant* all:

.1 guarantees;
.2 warranties;
.3 certificates;
.4 testing and balancing reports;
.5 distribution system diagrams;
.6 spare parts;
.7 operations and maintenance manuals which shall consist of three (3) hard copies and three (3) digital copies (on CD or DVD) and shall be well-organized and tabbed for ease of reference;
.8 samples;
.9 existing reports and correspondence from *Authorities Having Jurisdiction* in the *Place of the Work*; and

other materials or documentation required to be submitted under the *Contract*, together with written proof acceptable to the *Owner* and the *Consultant* that the *Work* has been substantially performed in conformance with the requirements of all *Governmental Authority* and utility authorities having jurisdiction in the *Place of the Work*.

5.4.9 Where the *Contractor* is unable to deliver the documents and materials described in paragraph 5.4.2 and 5.4.8, then, provided that none of the missing documents and materials interferes with the use and occupancy of the *Project* in a material way, the failure to deliver shall not be grounds for the *Consultant* to refuse to certify *Substantial Performance of the Work*. If the *Contractor* fails to deliver any of the materials required in subparagraphs 5.4.8.7 or 5.4.8.8, the *Consultant* may retain a reasonable amount or, where applicable, the amount specified in the Project Specific Supplementary Conditions from the payment of holdback under General Condition 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK. Should any documents or materials not be delivered in accordance with paragraph 5.4.2 by the earlier of sixty (60) calendar days following publication of the certificate of *Substantial Performance of the Work* and the submission of the *Contractor's* application for final payment under paragraph 5.5.1 of GC 5.5 – FINAL PAYMENT, then the amount previously retained pursuant to this provision shall be forfeited to the *Owner* as compensation for the damages deemed to have been incurred by the *Owner*, and not as a penalty, arising from the failure to deliver the documents or materials, and the *Contract Price* shall be reduced accordingly.

5.4.10 Together with the submission of its written application for *Substantial Performance of the Work*, the *Contractor* shall submit to the *Consultant* and to the *Owner* a *Statutory Declaration* setting forth in reasonable detail any then outstanding and unresolved disputes or claims between the *Contractor* and any *Subcontractor* or *Supplier,* including any claims allegedly arising from delay, which are, directly or indirectly, related to any then outstanding or anticipated disputes or claims between the *Contractor* and the *Owner,* and this disclosure shall, at a minimum:

.1 identify the parties involved;
.2 identify the amount in dispute;
.3 provide a brief statement summarizing the position of each party;
.4 include copies of any correspondence or documents in support of either party's position;
.5 include copies of any documents of any court or arbitration process related to the matter;
.6 identify the dispute or claim between the *Contractor* and the *Owner* to which the matter relates; and
.7 include a copy of any written agreement or a summary of any oral agreement between the parties related to resolution of the matter.

The disclosure requirements detailed herein are of a continuing nature and survive completion of the *Work*. Accordingly, the *Contractor* shall supplement the information provided with the original *Statutory Declaration* with additional materials pertaining to new or existing disputes or claims, as they become available. The *Contractor* shall not be entitled to recover from the *Owner* any amount pertaining to any claim or dispute referred to in this paragraph, if the provisions of this paragraph have not been fully complied with. For greater certainty, the *Contractor* is not obliged to make the aforementioned disclosure with respect to any dispute or claim that is not related to or does not touch upon any then outstanding and unresolved dispute or claim between the *Contractor* and the *Owner*.

5.4.11 Prior to the issuance of the certificate of *Substantial Performance of the Work,* the *Commissioning* of the *Work* must be successfully completed and the associated submittals evidencing same must be provided by the Contractor to the *Consultant* in order for the *Consultant* to verify that the *Project* is ready to use and/or is being used for its intended purpose."

PSSC 4. GC 5.10 WITHHOLDING OF PAYMENT

1. Add new paragraph 5.10.1 as follows:

"5.10.1 The *Consultant* may withhold from the *Contractor*, a minimum of FIVE THOUSAND DOLLARS ($5,000.00) from any final payments pending submission and approval of all *Project* close-out documentation including operations & maintenance manuals, *As-Built Drawings*, warranty information, training of staff, and confirmation of any materials to be left on-site for future repairs."

PSSC 5. FAIR WAGE POLICY

1. All references to the *Fair Wage Policy* shall only apply to the *Contract* where the *Contract Price* is FIVE HUNDRED THOUSAND DOLLARS ($500,000.00) or greater.

PSSC 6. GC 11.1 INSURANCE

1. Delete GC 11.1.1.1 as set out in SC60 of the Supplementary Conditions and replace with the following:

".1 Wrap-up Liability Insurance acceptable to the *Owner* having an inclusive limit of not less than $5,000,000 per occurrence for third party bodily injury, personal injury and property damage. Such insurance shall be in the name of the *Contractor* and shall name its *Subcontractors*, agent, architects, landscape architects, engineers, consultants, planners, project managers and the *Owner* as additional insureds thereunder and also include other persons which the *Owner* may reasonably require to be added as additional insured parties. The insurance coverage shall remain in effect throughout the time that the *Contract* is in effect, including the warranty period.

The Policy must include the following:
(1) personal injury liability, bodily injury and property damage;
(2) premises and operations liability;
(3) owner's and contractor's protective liability;
(4) broad form products and completed operations liability;
(5) cross liability;
(6) severability of interest;
(7) contingent employers liability;
(8) blanket written and oral contractual liability;
(9) all risks tenant's legal liability;

(10) hoist liability;
(11) fire fighting and forest fire fighting expense liability;
(12) employers liability and voluntary compensation;
(13) non-owned automobile liability;
(14) directors, officers, employees, shareholders, legislators, and officials involved in the *Project* added as insureds and/or additional insureds;
(15) shoring, blasting, excavating, under-pinning, demolition, pile driving and caisson work, work below and above ground surface, work below and above water, tunneling and grading, and similar operations associated with the construction work, as applicable;
(16) sudden and accidental pollution liability with a discovery provision of not less than one hundred and twenty (120) hours and a subsequent reporting provision of not less than one hundred and twenty (120) hours;
(17) 30 days written notice of cancellation;
(18) coverage as unnamed insureds, for all contractors, *Subcontractors*, consultants and employees of the *Contractor* provided that the *Owner* reserves the right to require the *Contractor* to add further parties as additional unnamed insured persons.
(19) with respect to "completed operations" work performed during the warranty period, premises and operations exposures from work that may need service, maintenance, correction, repair or replacement, but which is otherwise complete, will be treated as completed."

2. Delete GC 11.1.1.3 (non-owned automobile liability insurance) as set out in SC60 of the Supplementary Conditions and renumber the subsequent subsections of paragraph 11.1.1 accordingly.

PSSC 7. GC 11.1 INSURANCE

1. Delete GC 11.1.1.4 as set out in SC60 of the Supplementary Conditions and replace with the following:

".4 Property Installation Floater (All Risks) Insurance in an amount to adequately insure the *Contractor's* ownership interest in equipment and materials. The coverage shall provide for the full replacement value of the property, repairs, additions or equipment being installed, handled, or stored on or off premises awaiting installation and while in transit.

If the Property Installation Floater (All Risks) Insurance does not provide transportation coverage, separate Motor Truck Cargo or Transportation (All Risks) Insurance is to be provided for materials or equipment transported in the *Contractor's* vehicles or others hired by the *Contractor* from place of receipt to building sites or other storage sites."

PSSC 8. GC 11.1 INSURANCE

1. Add new paragraph 11.1.1.6 to SC60 of the Supplementary Conditions as follows:

".6 Contractor's Pollution Liability having an inclusive limit of not less than $5,000,000 per occurrence to insure the *Contractor's* liability for third-party claims caused by pollution events arising out of operations performed by or on behalf of the insured in the performance of the *Work* under the *Contract.* The insurance coverage shall remain in effect throughout the time that the *Contract* is in effect, including the warranty period."

PSSC 09. GC 14.5 LIQUIDATED DAMAGES

1. Delete "ONE THOUSAND DOLLARS ($1,000.00)" from paragraph 14.5.1 and replace with the following:

"FIVE HUNDRED DOLLARS ($500.00)"

Specifications and Drawings

City of Hamilton
Wentworth Operations Centre
Supply and Install a Domestic Hot Water (DHW) Solar Thermal and Unit Heaters Upgrade

ISSUED FOR TENDER

City of Hamilton Project No.: C13-21-14
WF Project No.: 2023-0524-10

Date: December 18, 2024

WALTERFEDY

DR KEY:

A = ARCHITECTURAL	S = STRUCTURAL	M = MECHANICAL
E = ELECTRICAL	LC = LEED CONSULTANT	EC = ENERGY CONSULTANT
C = CIVIL	L = LANDSCAPE CONSULTANT	O = OWNER

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with Instructions to Bidders, the General Conditions of the Contract, Supplementary Conditions and the General Requirements of Division 1.

1.2 SECTION INCLUDES

.1 Provide for all requirements related to setting out, co-ordination, administration, general construction, safety and protection of the Work, workmen, Owner's personnel and the public, the ongoing and final cleaning, and any other Work specified or indicated on the drawings.

1.3 NOTICE OF PROJECT

.1 Submit to the Ministry of Labour a Notice of Project indicating the project’s start date.

1.4 SCOPE OF WORK SUMMARY

.1 The project involves the removal and replacement of outdated natural gas heaters with twenty-eight (28) new units with at least 83% thermal efficiency, along with eleven (11) electric heaters of equivalent heating capacity. This project will also include the installation of three (3) new solar thermal domestic hot-water systems to supplement the existing DHW storage tanks. Contractor is to provide all labour, materials, plant, and equipment necessary to replace existing gas-fired unit heaters in workshop and maintenance areas, as specified in the tender documents, general requirements, drawings and specifications.

.2 This Work will involve removing existing unit heaters and installing new high-efficiency unit heaters located in workshop areas as outlined in the specifications and drawings accompanying this tender. Contractor will be responsible to perform the disconnect of current unit heaters and connection of new unit heaters to existing gas and vent piping. Contractor is responsible for the safe disposal of the old unit heaters.

.3 This Work will also involve installing a new solar thermal domestic hot water system located at roof level, and within the mechanical rooms as outlined in the specifications and drawings accompanying this tender. Contractor will be responsible to perform the connection of new solar heating equipment to existing domestic hot water equipment and piping. Contractor is responsible for the safe disposal of any plumbing works related to the installation.

1.5 BUILDING LAYOUT AND COMPLIANCE SURVEYS

.1 Arrange and pay for services of an Ontario Land Surveyor to establish property lines, erect a benchmark relating to nearest geodetic benchmark and stake principal corners of the new building.

.2 Foundation Verification: Arrange and pay for services of an Ontario Land Surveyor to certify that building foundations are located in accordance with the Contract documents. File certification with the Building Department and the Consultant immediately after the foundations are completed.

.3 Site Compliance Survey: Arrange and pay for the services of an Ontario Land Surveyor to verify all final site elevations of all graded areas, landscaped areas and asphalt areas. The results of this survey must be submitted to the Consultant for review before any topsoil or asphalt surfaces are applied.

1.6 GRADES, LINES & LEVELS

.1 Verify grades, lines and levels indicated on the drawings, particularly with relation to road and sidewalk elevations, with the Consultant at the time of laying out the building.

.2 Make spot checks of grades shown and report any variation from the Contract Documents.

1.7 BATTER BOARDS

.1 Erect, maintain and protect against damage strongly constructed batter boards, with adequate and uniform off-set, to precisely determine all main walls of the building.

.2 Construct batter boards of new lumber with rigid supports.

.3 Erect and maintain additional lines and elevation stakes at correct locations for the guidance of various trades.

1.8 PROJECT MEETINGS

.1 Schedule and hold pre-construction, progress and pre-installation meetings throughout construction of Work.

.2 Pre-Construction Meeting:

.1 Attend pre-construction meeting, to be held prior to commencement of Work at place and time to be announced by Consultant.

.2 Agenda: Project co-ordination, administrative procedures, scheduling and other related subjects.

.3 Progress Meetings:

.1 Schedule and administer bi-weekly progress meetings until Substantial Performance of the Work.

.2 Make physical arrangements, prepare agenda, and distribute notice of each meeting to participants, and to Consultant three days in advance of meeting date.

.3 The Contractor shall preside at meetings, record minutes, and distribute copies to participants and to entities affected by decisions at meetings within 5 working days.

.4 Locations of meetings: Project site office or other acceptable location.

.5 Minimum Agenda:

(1) Approval of minutes of previous meetings.
(2) Review of Work progress.
(3) Field observations, problems and decisions.
(4) Identification of problems which impede planned progress.
(5) Review of submittal schedule and status of submittals.
(6) Review of off-site fabrication and delivery schedules.
(7) Maintenance of progress schedule.
(8) Corrective measures to regain projected schedules.
(9) Planned progress during succeeding Work period.
(10) Co-ordination of projected progress.

(11) Maintenance of quality and Work standards.
(12) Effect of proposed changes on progress schedule and co-ordination.
(13) Other business relating to the Work.

.4 Pre-installation Meetings:

.1 Where required by the specifications or when deemed appropriate by the Contractor, hold pre-installation meetings with members of relevant trades involved to discuss installation of specific building products or elements.

.5 Coordination Meetings with Other Contractors:

.1 From time to time, and as directed by Owner, attend and participate in coordination meetings dealing with interfacing between other contractors and Contractor.

.6 Attendance at Meetings:

.1 Contractor, job superintendent, subcontractors, and suppliers as appropriate to agenda, and authorized to act on behalf of the entity each represents; Owner, Consultant, professional consultants and others may attend as appropriate.

1.9 PARKING

.1 Comply with local parking regulations.

.2 No parking will be allowed at the Place of the Work unless approved by Owner.

1.10 SITE ACCESS AND TRAFFIC CONTROL

.1 Reference section 01 55 26.

.2 Consult with authority having jurisdiction in establishing public thoroughfares to be used for site access haul routes.

.3 Coordinate and comply with local authorities regarding necessary diversion of roads or sidewalks (if applicable).

.4 Do not stack materials or supplies on existing roads or sidewalks.

.5 Maintain access roads in good condition.

.6 Protect permanent site improvements to remain such as curbs, pavement and utilities.

.7 Maintain access for fire-fighting equipment and access to fire hydrants.

1.11 SECURITY

.1 Protect and secure site, building, materials and equipment from theft, vandalism and unauthorized entry.

1.12 PROTECTION OF INSTALLED WORK

.1 Refer to various sections of specifications for specific requirements regarding protection of installed materials.

.2 Provide protective coverings at walls, projections, corners and jambs, sills and soffits of openings in and adjacent to traffic areas.

.3 Protect finished floors and stairs from dirt, wear and damage.

.4 Waterproofed and Roofed Surfaces:

.1 Restrict traffic to waterproofed and roofed surfaces and restrict material storage on these surfaces.

.2 When traffic or material storage is unavoidable, follow recommendations for protection of surfaces from manufacturer of roofing or waterproofing material.

.3 Keep waterproofed and roofed surfaces free of debris at all times.

.4 Protect pre-finished Work, including windows, louvers, finish hardware and doors from damage by mortar, paint, wallboard compounds and other construction materials and operations.

.5 Replace or make good, to the satisfaction of the Consultant, any building surface or installed material damaged prior to acceptance by the Owner and/or due to failure to provide suitable protection.

1.13 FIRE PROTECTION

.1 Provide and maintain, in good operating condition, adequate fire protection equipment suitable for fire hazards involved at convenient accessible locations during construction.

.2 Avoid accumulations of combustible forms, form lumber and debris within building and vicinity.

.3 Flammable Liquids:

.1 Store flammable or volatile liquids in open air or in small detached structures or trailers.

.2 Closely supervise storage of paint materials and other combustible finishing and cleaning products.

.3 Do not store oily rags in closets or other tight spaces.

.4 Comply with recommendations regarding fire protection made by representatives of insurance company carrying insurance on the Work or by local fire chief or fire marshal.

.5 Prohibit smoking in vicinity of hazardous operations.

1.14 SALVAGED MATERIAL

.1 Remove salvaged materials from site unless otherwise specified.

1.15 ALTERATIONS TO EXISTING WORK

.1 Where materials are to be removed for re-use or where existing finishes are to be cut out and later made good, employ qualified tradesmen skilled in the handling of each particular material. Make good to match existing adjoining construction.

.2 Make good damage to the existing building or contents due to construction Work.

.3 New Work in existing building shall conform to requirements of applicable trade sections.

.4 Make certain that all services affected by Work are cut off and are properly capped or diverted.

.5 Do not interrupt services to or within the existing building without prior consultation with Owner.

.6 Remove and dispose of:

_____

_____

.7 Remove, turn over to Owner:

_____

_____

.8 Remove, temporarily store, clean, alter to suit location and install at new location:

_____

_____

.9 Remove, temporarily store and turn over to other sections for building in:

_____

_____

1.16 CONSTRUCTION SAFETY

.1 The Contractor shall be liable for any costs, fines, penalties, etc., levied against the Owner or Consultant due to violations of the Construction Safety Act by construction personnel.

.2 Pursuant to the latest amendments to Ontario's Occupational Health and Safety Act, include the cost of management and non-management representatives to attend safety committee meetings as often as required by legislation.

1.17 SAFETY STATEMENT AND PROGRAM

.1 Post a safety policy statement at the Place of the Work and submit a copy of the safety program to the Consultant.

1.18 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

.1 Ensure all workers are trained in WHMIS. Submit proof of training if requested by the Consultant.

.2 Arrange for a complete set of material safety data sheets (MSDS) to be available at the Place of the Work for all products being used in the Work.

1.19 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Refer to GC 5.4 - Substantial Performance of the Work.

.2 Substantial Performance of the Work is required for Owner occupancy as outlined in the front end documentation.

.3 Should delays occur, neither the Owner nor Consultant shall be held responsible for Contractor claims. It is the intent that the Contractor will expeditiously complete the Work, providing whatever temporary facilities, utilities and controls are necessary to keep the Work on schedule.

.4 Should the issuance of the building permit by the local authority having jurisdiction, for whatever reason delay the commencement of the Work, no delay claim will be entertained by the Consultant.

END OF SECTION

1 GENERAL

1.1 WORK AREAS

.1 The Owner has arranged for easements for construction, storage and access as shown in the Contract Documents.

.2 Make arrangements with property owners if additional areas are required. Obtain written agreements and submit copies to Consultant.

.3 Confine operations within easements for construction, storage and access as shown in the Contract Documents.

.4 Install and maintain snow fencing along working and storage areas and access routes.

.5 Do not enter upon or occupy with workers, tools or materials any lands other than public streets, roadways, rights-of-way or easements indicated in the Contract Documents except after written consent has been received from property owner and a copy submitted to the Consultant. Any rentals or damages paid for occupying private lands shall be at the Contractor's expense.

.6 Provide the Consultant with letters from owners of adjacent property stating that the reinstatement Work carried out by the Contractor was satisfactory, in any case where damage has been caused to private property or Work carried out on it. A similar letter is required from the owner of utilities damaged during construction.

1.2 RESTRICTIONS ON USE OF PREMISES

.1 Limit use of premises for Work, for storage, and for access, to allow;

.1 Owner occupancy.

.2 Work by other contractors.

.3 Public usage.

.2 Coordinate use of premises under direction of Owner.

1.3 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period.

.2 Cooperate with Owner in scheduling operations to minimize disruptions and to facilitate Owner usage.

1.4 RESTRICTED HOURS OF WORK IN OCCUPIED FACILITIES

.1 Work may not be performed during Owner’s normal business hours which are Monday to Friday from 9:00 to 05:00, unless it has received prior approval from the Owner.

.2 Allow for hours of Work restrictions in construction progress schedule.

1.5 NOISY WORK RESTRICTIONS IN OCCUPIED FACILITIES

.1 Schedule excessively noisy Work to avoid disturbance to building occupants. Perform excessive noise generating Work outside of Owner’s business hours.

.2 Use powder actuated devices only with Consultant’s written permission.

1.6 MAINTAINING LIFE SAFETY SYSTEMS IN OCCUPIED FACILITIES

.1 Maintain operational life safety systems and public access to exits in occupied areas during all stages of the Work.

.2 Determine nature and exact locations of existing fire and smoke sensors prior to the commencement of the Work. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.

.3 Be responsible for costs incurred by Owner on account of false fire alarms activated as a result of the execution of the Work without adequate precautions.

END OF SECTION

1 GENERAL

1.1 DEFINITION

.1 In this section “Substitution” means a product, a manufacturer, or both, not originally specified in Contract Documents by proprietary name but proposed for use by Contractor in place of a product, a manufacturer, or both, specified by proprietary name.

1.2 SUBSTITUTION PROCEDURES

.1 Contractor may propose a Substitution wherever a product or manufacturer is specified by proprietary name(s), unless there is accompanying language indicating that Substitutions will not be considered.

.2 Contractor may propose a Substitution wherever a product or manufacturer is specified by proprietary name(s) and accompanied by language such as "or equal", "or approved equal", or other similar words. Do not construe such language as an invitation to unilaterally provide a Substitution without Consultant’s prior acceptance in writing. Do not order or install any Substitution without a Supplemental Instruction or Change Order.

.3 Provided a proposed Substitution submission includes all of the information specified in this Section under Submission Requirements for Proposed Substitutions, Consultant will promptly review and accept or reject the proposed Substitution.

.4 Consultant may accept a Substitution if satisfied that:

.1 the proposed substitute product is the same type as, is capable of performing the same functions as, interfaces with adjacent Work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance and maintenance considerations, of the specified Product,

.2 the proposed substitute manufacturer has capabilities comparable to the specified manufacturer, and

.3 the Substitution provides a benefit to Owner.

.5 If Contractor fails to order a specified product or order a product by a specified manufacturer in adequate time to meet Contractor’s construction schedule, Consultant will not consider that a valid reason to accept a Substitution.

.6 If Consultant accepts a Substitution and subject to Owner’s agreement, the change in the Work will be documented in the form of either a Supplemental Instruction or Change Order as specified in section 01 26 00 – Contract Modification Procedures.

.7 If a Substitution is accepted in the form of a Supplemental Instruction or Change Order, Contractor shall not revert to an originally specified product or manufacturer without Consultant’s prior written acceptance.

1.3 SUBMISSION REQUIREMENTS FOR PROPOSED SUBSTITUTIONS

.1 Include with each proposed Substitution the following information:

.1 Identification of the Substitution, including product name and manufacturer’s name, address, telephone numbers, and web site.

.2 Reason(s) for proposing the Substitution.

.3 A statement verifying that the Substitution will not affect the Contract Price and Contract Time or, if applicable, the amount and extent of a proposed increase or decrease in Contract Price and Contract Time on account of the Substitution.

.4 A statement verifying that the Substitution will not affect the performance or warranty of other parts of the Work.

.5 Manufacturer's product literature for the Substitution, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.

.6 Product samples as applicable.

.7 A summarized comparison of the physical properties and performance characteristics of the specified product and the Substitution, with any significant variations clearly highlighted.

.8 Availability of maintenance services and sources of replacement materials and parts for the Substitution, as applicable, including associated costs and time frames.

.9 If applicable, estimated life cycle cost savings resulting from the Substitution.

.10 Details of other projects and applications where the Substitution has been used.

.11 Identification of any consequential changes in the Work to accommodate the Substitution and any consequential effects on the performance of the Work as a whole. A later claim for an increase to the Contract Price or Contract Time for other changes in the Work attributable to the Substitution will not be considered.

1.4 INSTALLATION OF SUBSTITUTE PRODUCTS OR MATERIALS

.1 When an accepted substitute, or "equivalent to" item of equipment or material, requires changes or additions to project, make adjustments and changes required to coordinate Work for installation without additional cost to Owner.

1.5 CHANGES DUE TO SUBSTITUTIONS

.1 Any additional cost, loss or damage arising from substitutions are Contractor's responsibility, notwithstanding approval or acceptance of such substitution by Owner or Consultant, unless such substitution was made at written request or direction by the Owner or Consultant.

.2 Modifications to Contract Price Due to Substitutions:

.1 Owner will receive full credit for cost differential between specified item and proposed substitution.

.2 Substitution proposals that increase Contract price will be rejected, unless proposed substitution was made at written request or direction by the Owner or Consultant.

END OF SECTION

1 GENERAL

1.1 REQUESTS FOR INFORMATION (RFI)

.1 The Contractor shall review the contract documents and shall report promptly to the Consultant any error, inconsistency or omission the Contractor may discover.

.2 If the Contractor finds discrepancies in and/or omissions from the contract documents or has any doubt as to the meaning or intent of any part thereof, the Contractor must immediately notify the Consultant, who will provide written instructions or explanations. Neither the Owner nor the Consultant will be responsible for oral instructions.

.3 RFI is a formal process used during the Work to obtain information from Consultant with regards to Contract Documents.

.4 RFI does not constitute notice of claim for a delay.

.5 Submittal procedure:

.1 Submit RFI on form including the following information:

.1 Request for Information No.:

.2 Posted Date:

.3 Initiated Date:

.4 Date Required:

.5 Originated By:

.6 Specification Section:

.7 Drawing/Detail No.:

.8 Subject:

.9 Description/Question: (required)

.2 Submit necessary supporting information with RFI form.

.3 RFI Log:

.1 Maintain tracking log of RFIs sent to and responses received from Consultant complete with corresponding dates.

.6 Submit RFIs sufficiently in advance of affected parts of the Work so not to cause a delay in the Work. Any costs resulting from failure to do this will not be paid by Owner.

.7 Submit RFIs to Consultant only.

.8 Submit RFIs from Contractor only, RFIs submitted by subcontractors or suppliers will not be accepted.

.9 Number RFIs consecutively in 1 sequence in order submitted.

.10 Submit one RFI per RFI form.

.11 Allow 5 working days for review of RFI from time of Consultant's receipt of RFI to time of Consultant's return to Contractor. When the RFI submittal is received by the Consultant before 12:00:00pm, review period will begin that day. If it is received after 12:00:00pm the review period will begin the next Working Day.

.1 Contractor will establish a steady flow of RFIs for review and avoid accumulation of an excessive quantity of RFIs in a single submission. If, at any time, the Contractor submits a large enough number of RFIs such that the Consultant cannot process these RFIs within 5 Working Days, the Consultant, will confer with the Contractor within 1 Working Day of receipt of such RFIs, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority between the RFIs submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

.12 Consultant's response is not considered a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.

.13 Thoroughly review the contract documents to satisfy a claim, dispute or other matters in question relating to performance of the Work or interpretation of contract documents that cannot be resolved by direct reference to Contract Documents. Describe in detail this review on RFI form as part of RFI submission. RFIs lacking such detailed review description or where the detail provided is in opinion of Consultant insufficient, Consultant will not review RFI and reject it.

END OF SECTION

1 GENERAL

1.1 CONSTRUCTION START UP MEETING

.1 Promptly after contract award, Contractor shall establish the time and location of a construction start-up meeting to review and discuss administrative procedures and responsibilities. Contractor shall notify Consultant at least 5 working days before the meeting.

.2 Senior representatives of Owner, Consultant, and Contractor, including Contractor's project manager and site superintendent, and major Subcontractors, shall be in attendance.

.3 Contractor's representative will chair the meeting and record and distribute the minutes.

.4 Agenda will include following:

.1 Appointment of official representatives of Owner, Contractor, Subcontractors, Consultant, and Subconsultants.

.2 Project communications.

.3 Contract documents for construction purposes.

.4 Documents at the site.

.5 Contractor's use of premises.

.6 Owner-supplied products.

.7 Work restrictions.

.8 Contract modification procedures.

.9 Payment procedures.

.10 Construction progress meetings.

.11 Construction progress schedule, including long lead time items.

.12 Submittals schedule and procedures.

.13 Quality requirements, including testing and inspection procedures.

.14 Contractor's mobilization.

.15 Temporary utilities.

.16 Existing utility services.

.17 Construction facilities.

.18 Temporary barriers and enclosures.

.19 Temporary controls.

.20 Field engineering and layout of Work.

.21 Site safety.

.22 Site security.

.23 Cleaning and waste management.

.24 Closeout procedures and submittals.

.25 Other items.

1.2 CONSTRUCTION PROGRESS MEETINGS

.1 Schedule regular biweekly construction progress meetings for the duration of the Work. Contractor shall prepare meeting agendas, chair the meetings, and record and distribute the minutes.

.2 Arrange for and provide physical space for meetings.

.3 Contractor shall record in the meeting minutes significant decisions and identify action items and action dates by attendees or the parties they represent.

.4 Contractor shall distribute copies of minutes within three working days after each meeting to meeting attendees and any affected parties who may not be in attendance.

.5 Ensure that Subcontractors attend as and when appropriate to the progress of the Work.

.6 Agenda for each meeting shall include the following, as a minimum:

.1 Approval of minutes of previous meeting.

.2 Work progress since previous meeting.

.3 Field observations, including any problems, difficulties, or concerns.

.4 Construction progress schedule.

.5 Submittals schedule.

.6 Proposed changes in the Work.

.7 Requests for information.

.8 Site safety issues.

.9 Other business.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 This section specifies Contractor's responsibilities for preparation and submission of schedules and other documentation related to tracking construction progress.

.2 The purpose of submitting progress schedules is to:

.1 inform Owner and Consultant of actual progress versus planned progress, and

.2 provide assurance that scheduling issues are being proactively identified and addressed in a timely manner, and that planned progress is being maintained as closely as possible.

1.2 CONSTRUCTION PROGRESS SCHEDULE

.1 Format and Content:

.1 Provide a Work breakdown structure identifying key activities, Work packages, and major milestones, including long delivery products, inspection and testing activities, shutdown or closure activities, demonstration and training activities, and similar items, at a sufficient level of detail to effectively manage construction progress.

.2 Indicate milestone date[s] for Ready-for-Takeover and Substantial Performance of the Work.

.2 Submission:

.1 Submit initial schedule to Owner and Consultant within 10 working days after Contract award.

.2 Submit schedule via e-mail as .pdf files.

.3 Consultant will review format and content of initial schedule and request necessary changes, if any, within 5 working days after receipt.

.4 If changes are required, resubmit finalized initial schedule within 5 working days after return of review copy.

.5 Submit updated progress schedule bi-weekly to Owner and Consultant, indicating actual and projected start and finish dates with report date line and progress.

1.3 SUBMITTALS SCHEDULE

.1 Format and Content:

.1 Prepare schedule identifying all required Shop Drawing, product data, and sample submissions.

.2 Prepare schedule in electronic format.

.3 Provide a separate line for each required submittal, organized by specifications section names and numbers, and further broken down by individual products and systems as required.

.4 For each required submittal, show planned earliest date for initial submittal earliest date for return of reviewed submittal by Consultant and latest date for return of reviewed submittal without causing delay.

.5 Allow time in schedule for resubmission of submittals, should resubmission be necessary.

.2 Submission:

.1 Submit initial schedule to Consultant within 15 working days after contract award.

.2 Submit schedule via e-mail as .pdf files.

.3 Consultant will review format and content of initial schedule and request necessary changes, if any, within 5 working days after receipt.

.4 If changes are required, resubmit finalized schedule within 5 working days after return of review copy.

.5 Submit updated submittals schedule monthly to Owner and Consultant.

1.4 SCHEDULE MANAGEMENT

.1 A schedule submitted as specified and accepted by Consultant shall become the baseline schedule and shall be used as the baseline for updates.

.2 At each regular progress meeting, review and discuss current construction progress and submittals schedules with Consultant and Owner, including activities that are behind schedule and planned measures to regain schedule slippage in key areas on or near the critical path.

.3 Activities considered behind schedule are those with start or completion dates later than the dates shown on the baseline schedule.

1.5 RECORDING ACTUAL SITE CONDITIONS ON AS-BUILT DRAWINGS

.1 Obtain from Consultant an electronic copy of the construction drawings for the purpose of creating as-built drawings. Record information in electronic form, clearly identifying as-built deviations from the originally obtained construction drawings.

.1 A copy of the original contract drawings is available from the Consultant’s office:

.1 At an extra cost to the Contractor of $1500.

.2 Contact (Andrew Portengen) for Limitation of Liability Agreement.

.2 Clearly label each drawing as “AS-BUILT DRAWING”. Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.3 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 pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by Change Orders and Supplemental Instructions

.6 References to Shop Drawings, where Shop Drawings show more detail.

.4 Do not use as-built drawings for construction purposes.

1.6 PROGRESS PHOTOGRAPHS

.1 Arrange for periodic digital photography to document and provide a photographic record of the progress of the Work.

Identify each photograph by project name and date taken.

.2 Submission: Submit .jpg format files in standard resolution via e-mail monthly.

.3 Do not use progress or any other Project photographs for promotional purposes without Owner's written consent.

END OF SECTION

1 GENERAL

1.1 ADMINISTRATIVE

.1 Submit specified submittals to Consultant for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of contract time or for product substitutions or other deviations from the drawings and specifications.

.2 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.

.3 Do not proceed with Work affected by a submittal until review is complete.

.4 Present Shop Drawings, product data, and samples in SI metric units. Where items or information is not produced in SI Metric units, converted values are acceptable.

.5 Review submittals, provide verified field measurements where applicable, and affix Contractor's review stamp prior to submission to Consultant. Contractor's review stamp represents that necessary requirements have been determined and verified, and that the submittal has been checked and coordinated with requirements of the Work and Contract Documents.

.6 Verify field measurements and that affected adjacent Work is coordinated.

.7 Submittals not meeting specified requirements will be returned with comments.

.8 Reproduction of construction drawings to serve as background for shop drawings is not permitted. If construction drawings are used for this purpose, remove references to Consultant.

.9 Do not propose substitutions or deviations from Contract Documents via Shop Drawing, Product data and sample submittals.

.10 Maintain reviewed submittals, including all shop drawings, product data and samples at the Place of the Work, available for reference by Owner and Consultant.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Indicate products, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work.

.2 Where products attach or connect to other products, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross-references to drawings, specifications and other already reviewed shop drawings.

.3 Accompany submittals with a transmittal information including:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification of each submittal item and quantity.

.5 Other pertinent data.

.4 Shop Drawing submittals shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, date, and signature of Contractor's authorized representative responsible for shop drawing review, indicating that each shop drawing has been reviewed for compliance with Contract Documents and, where applicable, that field measurements have been verified.

.5 Details of appropriate portions of the 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 Relationships to other parts of the Work.

.5 Product data submittals shall include material safety data sheets (MSDS) for all controlled products.

.6 Submit electronic copy of shop drawings where specified in the technical Specifications.

.7 Submit electronic copy of product data sheets or brochures where specified in the technical Specifications.

.8 Where a submittal includes information not applicable to the Work, clearly identify applicable information and strike out non-applicable information.

.9 Supplement standard information to include details applicable to project.

.10 Allow 5 working days for Consultant's review of each submittal. Allow additional 5 working days where sub-Consultant review is required.

.11 If upon Consultant's review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of Work may proceed.

.12 If upon Consultant's review significant errors or omissions are discovered, a so noted copy will be returned for correction and resubmission. Do not commence fabrication or installation.

.13 Consultant's notations on submittals are intended to ensure compliance with Contract Documents and are not intended to constitute a change in the Work requiring change to the Contract Price or Contract Time. If Contractor considers any Consultant's notation to be a change in the Work, promptly notify Consultant in writing before proceeding with the Work.

.14 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.

1.3 INTERRERENCE DRAWINGS

.1 Prepare drawings indicating relationship of new and existing and unforeseen conditions at congested areas prior to commencement of the Work in those areas.

.2 For congested locations, before installation, prepare drawings showing relationships of ductwork, conduit, piping, sprinklers, ceiling supports and framing, communication and specialized equipment located within ceiling and shaft spaces.

.3 Indicate locations of visible items such as air handling outlets, light fixtures, smoke detectors, sprinkler heads, communication grilles and access panels occurring at these locations.

.4 Ensure interference drawings are initialled by a responsible person of each Subcontractor involved along with Contractor's signature and submitted to Consultant for review and record purposes.

1.4 CONTRACTOR'S REVIEW OF SUBMITTALS

.1 Prior to transmitting submittal, review and approve submittal, and affix Contractor's signature and stamp to submittal cover page.

.2 Consultant will not review submittals that do not bear the Contractor's signature and in the case of mechanical and electrical, the subcontractors' stamp and signature also. If it appears a review has not taken place, the submittal will be returned to the Contractor not reviewed.

.3 By signing and submitting shop drawings, product data, samples, and similar submittals, the Contractor represents that he has approved, determined and verified dimensions, quantities, field dimensions, relations to existing Work, coordination with Work to be installed later, coordination with information on previously accepted shop drawings, product data, samples, or similar submittals and verification of compliance with requirements of Contract Documents.

.4 In reviewing shop drawings, product data, samples, and similar submittals, the Consultant shall be entitled to rely upon Contractor's representation that information in submittals is correct and accurate.

.5 Submittals that are returned or rejected because of insufficient Contractor review or coordination will not be justification for a claim for extension of time.

1.5 CONSULTANT'S REVIEW OF SUBMITTALS

.1 After receipt of submittal, Consultant will review it for conformance to Contract Documents and certify that this review has been performed by affixing Consultant's review stamp.

.2 Review Time:

.1 Allow not less than ten working days for processing and review of any one submittal except as noted below, and except when processing must be delayed for coordination with subsequent submittals. Consultant will advise Contractor promptly of such delay.

.1 Allow an additional five working days for processing and review of submittals specified in Divisions 05, 09, 21, 22, 23, 25, 26, 27, and 28.

.2 Identify those submittals for which review is necessary urgently.

.3 Allow 4 weeks after submission of all samples in Division 09, for the Consultant to select finishes and prepare a colour schedule.

.2 Review period begins on date of receipt of submittal by Consultant and extends to mailing date of return to Contractor.

.3 Action Following Consultant's Review: Process submittals according to notations placed on them by Consultant.

.1 Reviewed:

.1 Proceed with fabrication, purchase, or both, of items in submittal, subject to the minor revisions or clarifications if any, included in the Consultant's review.

.2 Reviewed as Modified:

.1 Proceed with fabrication, purchase, or both, only after the original drawing has been corrected. Mechanical and electrical Contractors to include corrected drawings in maintenance and operating manuals.

.3 Resubmit:

.1 Submission is rejected, therefore fabrication and Work indicated cannot proceed.

.2 Correct submission and resubmit.

.4 Not Reviewed:

.1 Submission was not reviewed for one of the following reasons:

.1 Completed submittal cover page was not provided.

.2 Contractor's stamp was not found on submission.

.3 In the Consultant's opinion, review was not necessary.

.4 Limitations of Consultant's Review:

.1 Consultant's review is not a complete check, but only review of general methods of construction and detailing, subject to limitations and requirements set forth in GC 3.10.5.

.2 Consultant's review does not authorize changes in Contract Amount or Contract Time unless so stated in a separate proposed change or change directive.

.3 If the Contractor feels the shop drawing have changed the Contract Price or Contract Time, he must notify the Consultant within 7 working days from date of Consultant's transmittal otherwise it will be assumed no change in Contract Price or Contract Time will be considered.

.4 Review of shop drawings is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the reviewer approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the Place of the Work, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the Work.

.5 After the Consultant's review of a submittal or resubmittal, changes will not be considered unless accompanied by an explanation acceptable to the Consultant concerning reason substitution is necessary.

END OF SECTION

1 GENERAL

1.1 TEMPORARY UTILITIES - GENERAL

.1 Provide temporary utilities as specified and as otherwise necessary to perform the Work expeditiously.

.2 Remove temporary utilities after use.

1.2 TEMPORARY WATER SUPPLY

.1 Connect to and use Owner's existing water supply for temporary use during construction, subject to existing available volume and pressure. Reimburse Owner's utility costs based on metered usage. Install a sub-meter for this purpose at Contractor's cost.

.2 Arrange and pay for necessary water supply connections and disconnections.

1.3 TEMPORARY HEATING AND VENTILATION

.1 Arrange and pay for temporary heating and ventilation required during construction.

.2 Contractor may connect to and use Owner's existing supply of natural gas for temporary use during construction, subject to existing available volume and pressure. Reimburse Owner's utility costs based on metered usage. Install a sub-meter for this purpose at Contractor's cost.

.3 Vent construction heaters in enclosed spaces to the outside or use flameless type of construction heaters.

.4 Provide temporary heat for the Work as required to:

.1 Facilitate progress of Work.

.2 Protect the Work against dampness and cold.

.3 Prevent moisture condensation on surfaces, freezing, or other damage to finishes or stored products.

.4 Maintain specified minimum ambient temperatures and humidity levels for storage, installation and curing of products.

.5 After building is enclosed, maintain interior temperature of minimum 10 degrees C.

.5 Provide temporary ventilation for the Work as required to:

.1 Prevent accumulations of fumes, exhaust, vapours, gases and other hazardous, noxious, or volatile substances in enclosed spaces, as required to maintain a safe Work environment meeting applicable regulatory requirements.

.2 Ensure that hazardous, noxious, or volatile substances do not migrate to Owner occupied spaces.

.3 Ventilate temporary sanitary facilities.

.6 Do not use permanent building heating and ventilation systems during construction.

1.4 EXISTING BUILDING HEATING, VENTILATION, POWER, AND LIGHTING

.1 Existing building heating, ventilation, power, and lighting may be relied upon and used during construction except during hours or days when the building is not operational.

.2 Coordinate and make arrangements with the building operator and pay any costs required for provision of these services during hours or days when the building is not operational.

END OF SECTION

1 GENERAL

1.1 CONTRUCTION FACILITIES - GENERAL

.1 Provide temporary construction facilities as necessary for performance of the Work and in compliance with applicable regulatory requirements.

.2 Maintain temporary construction facilities in good condition for the duration of the Work.

.3 Remove temporary construction facilities from place of the Work when no longer required.

1.2 CONSTRUCTION PARKING

.1 Limited parking will be permitted at place of the Work provided it does not disrupt continuing operation of the facility.

1.3 VEHICULAR ACCESS

.1 Provide and maintain adequate access to place of the Work.

.2 Existing roads at place of the Work may be used for access to place of the Work, provided Contractor assumes responsibility for any damage caused by construction traffic, and prevents or promptly cleans up any mud tracking or material spillage.

.3 Consult with authority having jurisdiction in establishing public thoroughfares to be used for site access haul routes.

.4 Coordinate and comply with local authorities regarding necessary diversion of roads or sidewalks (if applicable).

.5 Do not stack materials or supplies on existing roads or sidewalks.

.6 Maintain access roads in good condition.

.7 Protect permanent site improvements to remain such as curbs, pavement and utilities.

.8 Maintain access for fire-fighting equipment and access to fire hydrants.

1.4 SITE OFFICES

.1 Provide a temperature controlled and ventilated office, with suitable lighting, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Provide products that are not damaged or defective, and suitable for purpose intended, subject to specified requirements. If requested by Consultant, furnish evidence as to type, source and quality of Products provided.

.2 Unless otherwise specified, maintain uniformity of manufacture for like items throughout.

1.2 PRODUCT OPTIONS

.1 Subject to the provisions of section 01 25 00:

.1 Wherever a product or manufacturer is specified by a single proprietary name, provide the named Product only.

.2 Wherever more than one product or manufacturer is specified by proprietary name for a single application, provide any one of the named Products.

.2 Wherever a product is specified by reference to a standard only, provide any product that meets or exceeds the specified standard. If requested by Consultant, submit information verifying that the proposed product meets or exceeds the specified standard.

.3 Wherever a product is specified by descriptive or performance requirements only, provide any product that meets or exceeds the specified requirements. If requested by Consultant, submit information verifying that the proposed product meets or exceeds the specified requirements.

1.3 PRODUCT AVAILABILITY AND DELIVERY TIMES

.1 Promptly upon Contract award and periodically during construction, review and confirm product availability and delivery times. Order products in sufficient time to meet the construction progress schedule and the Contract Time.

.2 If a specified product is no longer available, promptly notify Consultant. Consultant will take action as required.

.3 If delivery delays are foreseeable, for any reason, promptly notify Consultant.

.1 If a delivery delay is beyond Contractor’s control, Consultant will provide direction.

.2 If a delivery delay is caused by something that was or is within Contractor’s control, Contractor shall propose actions to maintain the construction progress schedule for Consultant’s review and acceptance.

1.4 STORAGE, HANDLING, AND PROTECTION

.1 Store, handle, and protect products during transportation to Place of the Work and before, during, and after installation in a manner to prevent damage, adulteration, deterioration, and soiling.

.2 Comply with manufacturer's instructions for storage, handling, and protection.

.3 Store packaged or bundled products in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in Work.

.4 Comply with the requirements of the workplace hazardous materials information system (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, including requirements for labeling and the provision of material safety data sheets (MSDS).

.5 Store products subject to damage from weather in weatherproof enclosures.

.6 Store sheet products on flat, solid, supports and keep clear of ground. Slope to shed moisture.

.7 Remove and replace damaged products.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 Except where otherwise specified in technical Specifications or otherwise indicated on drawings, comply with requirements of this section.

1.2 MANUFACTURER'S INSTRUCTIONS

.1 Install, erect, or apply products in strict accordance with manufacturer's instructions.

.2 Notify Consultant, in writing, of conflicts between Contract Documents and manufacturer's instructions where, in Contractor's opinion, conformance with Contract Documents instead of the manufacturer's instructions may be detrimental to the Work or may jeopardize the manufacturer's warranty.

.3 Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.4 Provide manufacturer's representatives with access to the Work at all times. Render assistance and facilities for such access so that manufacturer's representatives may properly perform their responsibilities.

1.3 QUALITY OF WORK

.1 Comply with industry standards specified except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise quality of Work.

.2 Where no explicit quality or standards for materials or quality of Work are established for Work, such Work shall be of good quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the project generally.

1.4 ANCHORAGE

.1 Secure products with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

1.5 MOUNTING HEIGHTS

.1 Where mounting heights are not indicated, mount individual units of Work at industry-recognized standard mounting heights for applications indicated.

.2 Refer questionable mounting height choices to Consultant before proceeding.

.3 Obtain exact locations of fixtures and outlets from Consultant before Work is roughed in; Work installed without such information from Consultant shall be relocated at Contractor's expense.

1.6 EQUIPMENT PREPARATION

.1 Lubricate moving parts.

.2 Test and start up motors and machinery.

.3 Replace defective or damaged equipment.

1.7 OVERLOADING

.1 Precautions shall be taken to prevent overloading of any part of the structure, falsework or scaffolding during operations. If doubt exists, obtain approval from Consultant.

1.8 LOAD BEARING MEMBERS

.1 Load bearing members shall not be cut, bored or sleeved without written approval of the Consultant. All cuts shall be made with clean, true and smooth edges.

.2 Where required by the Consultant, reinforcement of any such openings shall be made at the Contractor's expense. Any such reinforcement shall be detailed by the Contractor and bear the stamp of a Professional Engineer.

1.9 CONCEALMENT

.1 Conceal pipes, ducts, and wiring in floors, walls and ceilings in finished areas:

.1 after review by Consultant and authority having jurisdiction, and

.2 where locations differ from those shown on drawings, after recording actual locations on as-built drawings.

.2 Provide incidental furring or other enclosures as required.

.3 Notify Consultant in writing of interferences before installation.

1.10 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.

.2 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.

.3 Use non-corrosive fasteners and anchors for securing exterior Work and in spaces where high humidity levels are anticipated.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.

.7 Powder Activated Fasteners:

.1 Powder activated fastenings shall not be used on any portion of the Work unless approval for a specific use is obtained from the Consultant.

1.11 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Bolts shall not project more than one diameter beyond nuts.

1.12 FIRE RATED ASSEMBLIES

.1 When penetrating fire rated walls, ceiling, or floor assemblies, completely seal voids with fire-stopping materials, smoke seals, or both, in full thickness of the construction element as required to maintain the integrity of the fire rated assembly.

1.13 LOCATION OF FIXTURES, OUTLETS AND DEVICES

.1 Consider location of fixtures, outlets, and devices indicated on drawings as approximate.

.2 Locate fixtures, outlets, and devices to provide minimum interference, maximum usable space, and as required to meet safety, access, maintenance, acoustic, and regulatory, including barrier free, requirements.

.3 Promptly notify Consultant in writing of conflicting installation requirements for fixtures, outlets, and devices. If requested, indicate proposed locations and obtain approval for actual locations.

1.14 PROTECTION OF COMPLETED WORK AND WORK IN PROGRESS

.1 Adequately protect parts of the Work completed and in progress from any kind of damage.

.2 Promptly remove, replace, clean, or repair, as directed by Consultant, Work damaged as a result of inadequate protection.

.3 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the safety or integrity of the Work.

1.15 REMEDIAL WORK

.1 Notify Consultant of, and perform remedial Work required to, repair or replace defective or unacceptable Work. Ensure that properly qualified workers perform remedial Work. Coordinate adjacent affected Work as required.

END OF SECTION

1 GENERAL

1.1 REQUEST FOR CUTTING, PATCHING AND REMEDIAL WORK

.1 Submit written request in advance of cutting, coring, or alteration which affects or is likely to affect:

.1 Structural integrity of any element of the Work.

.2 Integrity of weather exposed or moisture resistant elements.

.3 Efficiency, maintenance, or safety of any operational element.

.4 Visual qualities of sight exposed elements.

.5 Work of Owner or other contractors.

.6 Warranty of products affected.

.2 Include in request:

.1 Identification of project.

.2 Location and description of affected Work, including drawings or sketches as required.

.3 Statement on necessity for cutting or alteration.

.4 Description of proposed Work, and products to be used.

.5 Alternatives to cutting and patching.

.6 Effect on Work of Owner or other contractors.

.7 Written permission of affected other contractors.

.8 Date and time Work will be executed.

1.2 PRODUCTS

.1 Unless otherwise specified, when replacing existing or previously installed products in the course of cutting and patching Work, use replacement products of the same character and quality as those being replaced.

.2 If an existing or previously installed product must be replaced with a different product, submit request for substitution in accordance with section 01 25 00.

1.3 PREPARATION

.1 Inspect existing conditions in accordance with section 01 71 00.

.2 Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of the Work from damage.

.3 Provide protection from elements for areas that may be exposed by uncovering Work.

1.4 EXISTING UTILITIES

.1 Where the Work involves breaking into or connecting to existing services, give Owner forty-eight hours notice for necessary interruption of mechanical or electrical services.

.2 Maintain excavations free of water.

.3 Keep duration of interruptions to a minimum.

.4 Carry out interruptions after regular working hours of occupants, preferably on weekends, unless Owner's prior written approval is obtained.

.5 Protect and maintain existing active services. Record location of services, including depth, on as-built drawings.

.6 Construct or erect barriers in accordance with section 01 56 00 as required to protect pedestrian and vehicular traffic.

1.5 CUTTING, PATCHING, AND REMEDIAL WORK

.1 Coordinate and perform the Work to ensure that cutting and patching Work is kept to a minimum.

.2 Perform cutting, fitting, patching, and remedial Work including excavation and fill, to make the affected parts of the Work come together properly and complete the Work.

.3 Provide openings in non structural elements of the Work for penetrations of mechanical and electrical Work.

.4 Perform cutting by methods to avoid damage to other Work.

.5 Provide proper surfaces to receive patching, remedial Work, and finishing.

.6 Perform cutting, patching, and remedial Work using competent and qualified specialists familiar with the products affected, in a manner that neither damages nor endangers the Work.

.7 Do not use pneumatic or impact tools without Consultant's prior approval.

.8 Ensure that cutting, patching, and remedial Work does not jeopardize manufacturers' warranties.

.9 Refinish surfaces to match adjacent finishes. For continuous surfaces refinish to nearest intersection. For an assembly, refinish entire unit.

.10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces with suitable allowance for deflection, expansion, contraction, acoustic isolation, and firestopping.

.11 Maintain fire ratings of fire rated assemblies where cutting, patching, or remedial Work is performed. Completely seal voids or penetrations of assembly with firestopping material to full depth or with suitably rated devices.

END OF SECTION

1 GENERAL

1.1 REGULATORY REQUIREMENTS

.1 Comply with applicable regulatory requirements when disposing of waste materials.

.2 Obtain permits from authorities having jurisdiction and pay disposal fees where required for disposal of waste materials and recyclables.

1.2 GENERAL CLEANING REQUIREMENTS

.1 Provide adequate ventilation during use of volatile or noxious substances. Do not rely on building ventilation systems for this purpose.

.2 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.3 Prevent cross-contamination during the cleaning process.

.4 Notify the Consultant of the need for cleaning caused by Owner or other contractors.

1.3 PROGRESSIVE CLEANING AND WASTE MANAGEMENT

.1 Maintain the Work in a tidy and safe condition, free from accumulation of waste materials and construction debris.

.2 Provide appropriate, clearly marked, containers for collection of waste materials and recyclables.

.3 Remove waste materials and recyclables from Work areas, separate, and deposit in designated containers at end of each working day. Collect packaging materials for recycling or reuse.

.4 Remove waste materials and recyclables from Place of the Work at regular intervals.

.5 Clean interior building areas prior to start of finish Work and maintain free of dust and other contaminants during finishing operations.

.6 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly finished surfaces nor contaminate building systems.

1.4 FINAL CLEANING

.1 Before final cleaning, arrange a meeting at Place of the Work to determine the acceptable standard of cleaning. Ensure that Owner, Consultant, Contractor and cleaning company are in attendance.

.2 Remove from Place of the Work surplus products, waste materials, recyclables, temporary Work, and construction equipment not required to perform any remaining Work.

.3 Provide professional cleaning by a qualified, established cleaning company.

.4 Lock or otherwise restrict access to each room or area after completing final cleaning in that area.

.5 Re-clean as necessary areas that have been accessed by Contractor’s workers prior to Owner occupancy.

.6 Remove stains, spots, marks, and dirt from finished surfaces, electrical and mechanical fixtures, furniture fitments, walls, floors.

.7 Remove dust from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces.

.8 Vacuum clean and dust exposed wall, floor, and ceiling surfaces, behind grilles, louvres and screens.

.9 Clean mechanical, electrical, and other equipment. Replace filters for mechanical equipment if equipment is used during construction.

.10 Remove waste material and debris from crawlspaces and other accessible concealed spaces.

.11 Remove stains, spots, marks, and dirt from exterior facades.

.12 Clean exterior and interior window glass and frames.

.13 Clean and sweep roofs, clear roof drains.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Dispose of waste materials and recyclables at appropriate municipal landfills and recycling facilities in accordance with applicable regulatory requirements.

.2 Do not burn or bury waste materials at Place of the Work.

.3 Do not dispose of volatile and other liquid waste such as mineral spirits, oil, paints and other coating materials, paint thinners, cleaners, and similar materials together with dry waste materials or on the ground, in waterways, or in storm or sanitary sewers. Collect such waste materials in appropriate covered containers, promptly remove from Place of the Work, and dispose of at recycling facilities or as otherwise permitted by applicable regulatory requirements.

.4 Cover or wet down dry waste materials to prevent blowing dust and debris.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with Instructions to Bidders, the General Conditions of the Contract, Supplementary Conditions and the General Requirements of Division 1.

1.2 SECTION INCLUDES

.1 Submittals and procedures required for closeout.

1.3 TAKE OVER PROCEDURES

.1 For the purpose of closing out this construction project and the takeover of the project by the Owner from the Contractor, the "Ontario Association of Architects/Ontario General Contractors Association Take-Over Procedures" document will be used with the following additions, clarifications and modifications.

.2 Provided below, for the Contractor and his Subcontractors benefit, is a list of minimum requirements for this Contract closeout.

.1 Contractor to notify Consultant, in writing, when he feels he meets the requirements of Substantial Performance as set out in the "take-over procedures".

.2 The Consultant, the Contractor and his required Subcontractors shall prepare a list of incomplete and unsatisfactory Work.

.3 Contractor shall make written application to the Consultant for Substantial Performance which must include all of the following:

(1) Statement that the contract is substantially performed in compliance with the Contract Documents.
(2) An invoice showing the amount of holdback owing accompanied by a Statutory Declaration and WSIB Certificate of Clearance.
(3) Submission of closeout requirements.
(4) A statement of completion with cost values as described in the "Take-Over Procedures - 3.2 (d)."

.4 If the Consultant finds the Contractor's application complete, he will visit the Place of the Work and verify the validity of the application.

.5 If the application is approved by the Consultant, he will issue a Certificate of Substantial Performance of the Work to the Owner and the Contractor.

.6 The Contractor shall publish a copy of the Certificate of Substantial Performance of the Work in the "Daily Commercial News" and provide a copy to the Consultant.

.7 The sixty day lien period begins on the date of publication with the holdback monies due, if no liens exist, on the sixty-first (61st) day.

.8 Deficiencies:

(1) When all deficiencies have been completed and verified by the Contractor, he must notify the Consultant for further review. Upon becoming satisfied that all deficiencies have been corrected and upon receiving all certificates, warranties, balancing reports and tax rebates and upon verifying completeness of all final cleaning and demonstrations and upon receiving the Contractor's final invoice, a final payment certificate will be issued by the Consultant.
(2) If the Contractor notifies the Consultant to re-review deficiencies, and upon visiting the project, the Consultant finds less than 75% completion of the outstanding listed deficiency items, it will be judged that the Contractor has not verified the deficiencies prior to notifying the Consultant. If this occurs, all future re-review hours will be charged to the Contractor on an hourly basis. The hourly rate charged will be $120.00/hour plus Value Added Taxes and plus travel costs.
(3) If all deficiencies are not completed within a reasonable period of time, the Consultant will invoke the requirements of GC 7.1 - OWNERS RIGHT TO PERFORM WORK OR STOP THE WORK OR TERMINATE CONTRACT.

.9 The warranty period(s) commences on the date of substantial performance of the Work.

(1) Assemble warranties, affidavits and certificates required by Contract Documents for various materials, systems and equipment.
(2) Include copies of permits and certificates of inspection obtained by Contractor.
(3) Place documents in order and list each document on transmittal letter or form.

1.4 CLOSEOUT REQUIREMENTS

.1 Project Record Documents: as specified in Section 01 78 39.

.2 Information Manuals: as specified in Section 01 78 39.

.3 Keys and keying schedule including statement that construction lock cylinders have been converted.

1.5 EXTRA STOCK AND PARTS

.1 Deliver to Owner extra stock of materials, spare parts and loose accessories required by Contract Documents.

.2 Include special tools for items such as thermostats and adjustable dampers and give instructions for use.

.3 Provide protective wrapping or packaging labelled with full identification of item. Materials are to be provided in unbroken cartons, or if not supplied in cartons, they shall be strongly packaged.

.4 Store neatly in the storage locations as predetermined by Owner.

1.6 CERTIFICATES

.1 Provide to the Consultant any certificates required by all local authorities and all certificates of compliance or verification required throughout the specification. Any certificates obtained prior to the maintenance manual submission should be included in the manual. Any certificates obtained after the maintenance manual submission shall be sent to the Consultant prior to final payment certification.

1.7 WARRANTIES

.1 Provide to the Consultant, all specified warranties, extended warranties and free manufacturer extended warranties as applies to each individual section.

.2 The warranty period(s) commence on the date of substantial performance of the Work and shall be valid for the full duration specified.

.3 Submit warranties to the Consultant prior to final payment certification.

1.8 DEMONSTRATION OF SYSTEMS

.1 Provide instruction to the Owner's operating and maintenance personnel, during regular Work hours, on the care, operation and maintenance of all equipment and systems as specified in the applicable sections. Refer to the various sections of the specifications for the specific instructional requirements.

.2 All instructional periods shall be prior to the acceptance and handover of systems to the Owner for operation responsibility and also prior to final payment certification.

.3 For equipment requiring seasonal operation, perform instructions for other seasons within six months.

.4 Use information manual for basis of instruction. Review contents of manual with personnel in detail to explain operation and maintenance.

.5 Prepare and insert additional data in the Information manual when need for such data becomes apparent during instruction.

.6 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance and shutdown of each item of equipment at equipment location.

.7 Refer to mechanical and electrical documents for additional requirements.

1.9 TESTING AND BALANCING OF MECHANICAL SYSTEMS

.1 The Mechanical Subcontractor is to include all costs to employ an independent testing company to test and balance all mechanical systems.

.2 The mechanical subcontractor must list on his bid form the balancing Sub-subcontractor to be used. If no Subcontractor is selected, the first name listed in section 20 05 06 shall be provided.

.3 The Consultant reserves the right to have the air and water balancing verified by an independent agency.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with Instructions to Bidders, the General Conditions of the Contract, Supplementary Conditions and the General Requirements of Division 1.

1.2 PROJECT RECORD DOCUMENTS

.1 The project record documents consist of as-built drawings and specifications, and the accepted shop drawings, product data sheets, and samples.

.2 Maintain the as-built documents, shop drawings, product data sheets and samples at the Place of the Work.

.3 Request from the Consultant a complete set of the Contract Documents for creation of the as-built documents. Costs of obtaining these documents are the responsibility of the Contractor.

.4 Record the actual "as-built" details of the project throughout the duration of the Work.

.1 Modify the documents and accurately record significant deviations from the Contract Documents, caused by existing conditions and changes originated by the Consultant, Contractor and Subcontractor originated changes, change orders, supplemental instructions, Addenda, instructions by correspondence and jurisdictional authority approvals.

.2 Carefully record location of concealed elements required for maintenance, alteration Work and building additions.

.3 Eradicate obsolete information.

.5 Clearly mark each set as "as-built copy". It includes both hard copy and AutoCAD (the latest version) files. Maintain in good condition, available at all times for inspection by the Consultant. Do not use for construction purposes. The Contractor must submit all as-builts (hard copy as well as AutoCAD and PDF format on a USB flash drive) prior to the release of any holdback payments.

.6 Keep as-built documents current and do not record irrelevant information.

.1 Do not permanently conceal any Work until the required information has been recorded.

.2 Proof that the as-built documents are current will consist of the Consultant making a visual check.

.7 Maintenance of the as-built documents to current stage of construction shall be considered a condition precedent for validation of any application for payment made by Contractor.

.8 Date entries with proper reference to the appropriate Change Order or approval number. Call attention to the entry by a "cloud" around the area or areas affected.

.9 At Substantial Performance of the Work, submit one complete set of final "reviewed" or "reviewed-as-modified" Shop Drawings and product data sheets, on which corrections have been recorded of changes made during fabrication and installation of unforeseen conditions. Do not include drawings which were "returned and resubmit."

.10 Conversion of Schematic Layouts:

.1 Drawings indicate mechanical and electrical conduits, circuits, piping, ducts and other similar items, in schematic form and do not indicate precise physical layout.

.2 Indicate on as-built drawings, by accurate dimension, centerline of each run for relevant items.

.3 Clearly identify items by accurate note such as "cast-iron drain", "galv. water pipe" or "return air duct".

.4 Indicate by symbol or note, vertical locations of items such as "under slab", "in ceiling plenum" or "exposed".

.5 Identify elements and locations with description that can be related reliably to Contract Documents.

.6 Site Plan: Refer to section 01 10 00 for requirements for foundation verification and site compliance surveys.

1.3 INFORMATION MANUAL

.1 Format:

.1 Covers: plastic covered, 3-ring, loose-leaf binders bearing title of Project and date on typed label.

.2 Sheets: 8-1/2 inches x 11 inches, except pullout sheets may be neatly folded to 8-1/2 inches x 11 inches.

.3 Organize contents into applicable sections of Work to parallel project section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.

.4 Provide manual in three separate volumes: One for mechanical, one for electrical and one for all other disciplines.

.5 Provide a minimum of one copy of the information manual in electronic format on a USB flash drive.

.6 Submit three copies of each volume to Owner.

.7 Each manual shall include individual electronic copies of each section of the manual in Adobe Portable Document Format (.pdf) stored and individually indexed to match the specified manual format on a labelled USB flash drive.

.2 Contents:

.1 Provide the following information for products and systems scheduled for inclusion in manual:

(1) Names, addresses, phone and fax numbers
(2) Copy of hardware and finish schedule.
(3) Copies of final revised shop drawings of each trade. Reinforcing steel bar lists and structural steel detail drawings need not be part of this manual.
(4) Maintenance instructions for finished surface materials.

(5) Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplates information such as make, size, capacity and serial numbers.
(6) Materials used on the project as required by extras, alternates or substitutions showing name of manufacturer and source of supply.

.2 Where required in technical specification sections, include, as applicable, the following additional information provided by manufacturer or fabricator:

(1) Written recommendations for cleaning agents, methods and precautions and recommended cleaning and maintenance schedules.
(2) Written operating and emergency procedure instructions for equipment and recommended maintenance procedures and schedules.
(3) Equipment or product catalogue data, wiring diagrams, spare parts lists for each piece of equipment, accessories, controls and fixtures.
(4) Include name, address and telephone number of local representative for principal items of equipment.

.3 Mechanical, plumbing and electrical systems: See mechanical and electrical documents for specific requirements.

.4 Provide additional information for the information manual as may be specified in the technical specification Sections.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 Demonstrate and provide training to Owner's personnel on operation and maintenance of equipment and systems prior to scheduled date of Substantial Performance of the Work.

.2 Owner will provide list of personnel to receive training and will coordinate their attendance at agreed upon times.

.3 Coordinate and schedule demonstration and training provided by Subcontractors and Suppliers.

1.2 SUBMITTALS

.1 Submit proposed dates, times, durations, and locations for demonstration and training of each item of equipment and each system for which demonstration and training is required. Allow sufficient time for training and demonstration for each item of equipment or system, or time as may be specified in technical specifications.

.2 Consultant and Owner will review submittal and advise Contractor of any necessary revisions.

.3 Submit report(s) within 5 working days after completion of demonstration and training:

.1 identifying time and date of each demonstration and training session,

.2 summarizing the demonstration and training performed, and

.3 including a list of attendees.

.4 Submit video record of demonstration and training together with report.

1.3 PREREQUISITES TO DEMONSTRATION AND TRAINING

.1 Testing, adjusting, and balancing has been performed in accordance with Contract Documents.

.2 Equipment and systems are fully operational.

.3 Copy of completed operation and maintenance manual is available for use in demonstration and training.

.4 Conditions for demonstration and training comply with requirements specified in technical Specifications.

1.4 DEMONSTRATION AND TRAINING

.1 Demonstrate start up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment and system.

.2 Review operation and maintenance manual in detail to explain all aspects of operation and maintenance.

.3 Prepare and insert additional information in operation and maintenance manual if required.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01.

1.2 SUMMARY

.1 Section includes:

.1 Complete all the removal and demolition Work as indicated on the drawings and as specifically mentioned in these Specifications, including but not limited to the following:

(1) Demolition and removal of selected portions of existing building components or structural elements.
(2) Repair procedures for selective demolition operations

1.3 REFERENCES

.1 Reference standards: versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

(1) CSA S350-M – Code of Practice for Safety in Demolition of Structures.

(2) CSA Z783 – Deconstruction of Buildings and Their Related Parts.

.2 National Fire Protection Association (NFPA):

(1) NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.4 REPORTS

.1 The Owner and Consultant assume no responsibility for any interpretation or deduction that the Contractor may make from third-party reports. Establish the nature of existing conditions to own satisfaction.

1.5 PERMITS AND REGULATIONS

.1 Refer to GC 10.2.

.2 Apply for the demolition permit.

.3 Arrange and pay for landfill fees, notices, and inspections necessary for the proper execution and completion of the demolition.

1.6 EXISTING SERVICES

.1 Locate and disconnect, cap and plug gas, water, sewer, hydro, telephone and other services as required. In each case, notify the authority having jurisdiction and obtain their written approval obtained before commencing that portion of the Work. Approximate locations of existing utilities have been indicated on the accompanying drawings. No responsibility is assumed by the Consultant for the exact locations as shown.

1.7 SUBMISSIONS

.1 The Contractor shall submit a detailed demolition methodology statement covering equipment to be used, safety procedures to be adopted, temporary shoring if required, demolition sequence, etc.

2 PRODUCTS

2.1 SALVAGE MATERIAL

.1 All material from the demolition shall become the property of this Contractor unless noted, who shall remove all material and debris from the Place of the Work as quickly as possible. Burning debris at the Place of the Work will not be permitted.

.2 Endeavour to sort and recycle materials wherever practical.

3 EXECUTION

3.1 EXAMINATION

.1 Visit the Place of the Work and note conditions affecting the Work of this section.

.2 No allowance will be made for any difficulties encountered or any expenses resulting from conditions at the Place of the Work or any item existing thereon which is visible or known to exist at the time of bidding.

3.2 REMOVALS

.1 General:

.1 Carry out demolition, removal and disposal in accordance with the methodology statement and with applicable provincial and local regulations and the demolition methodology statement submitted for demolition permit issuance.

.2 Execute demolition in an orderly and careful manner with due consideration for adjacent structures and finishes.

.3 Keep Work wetted down thoroughly to prevent dust and dirt from rising during demolition operations. Water shall be provided for this purpose by this Contractor. Upon completion of Work, any temporary water and power lines shall be removed.

.4 Take necessary precautions to guard against movement or settlement of the remaining structure, including necessary bracing or shoring.

.5 Where demolition results in obsolete openings in existing walls, floors, ceilings, roofs, etc., such openings shall be infilled and patched to match existing adjacent construction, structural integrity, workmanship and fire ratings. Where demolition leaves existing finishes, surfaces, etc. in a state of noticeable disrepair, unevenness, with voids, dissimilar colour, etc., patching shall be completed as referenced in other specification sections.

.2 Asbestos Removal:

.1 Asbestos removal and disposal shall be undertaken by a licensed Asbestos Abatement Contractor in accordance with the requirements of Ontario Regulation 309 as amended. The Contractor is responsible for undertaking air monitoring and any other requirements of regulatory agencies or local municipalities. Disposal shall be at a licensed landfill.

.3 Polychlorinated Biphenyl (PCB) Ballasts:

.1 The Contractor, in conjunction with the inspection and testing company, shall determine the ballasts containing PCB's. These shall be stored in the designated storage facility. Handling and storage shall be undertaken in accordance with Ontario Regulation 11/82 as amended and any other provincial and municipal requirements. Non-PCB contaminated ballasts shall be disposed of at a licensed landfill.

3.3 CLEANING

.1 Clean Work area daily in accordance with section 01 74 00.

.2 Remove all excess materials from site as Work proceeds and at completion.

.3 On completion of the Work remove all tools, containers, surplus materials, equipment, waste, etc., and leave site neat, clean and tidy to the satisfaction of the Owner.

.4 Clean and make good surfaces soiled or otherwise damaged as a result of Work of this section at no additional cost to the Owner.

.5 Leave the Place of the Work in a clean and orderly condition to the satisfaction of the Consultant. If this Contractor fails to do so the Consultant may order excess debris to be removed at this Contractor's expense.

3.4 PROTECTION

.1 This Contractor shall be entirely responsible for, and make good damage to adjoining properties and buildings, adjacent walks, curbs, etc.

.2 This Contractor shall be entirely responsible for the safety of all persons lawfully engaged on the Work when such injury is caused by negligence or any act of this Contractor or any person or persons engaged in the Work of this section.

.3 It shall be the responsibility of this Contractor to protect the public from injury during the course of demolition by providing suitable barriers, fences, coverings, guardrails, etc., that may be required by the Owner or authorities having jurisdiction.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This section specifies requirements and instructions that are common to mechanical Work sections of the specification and it is a supplement to each section and is to be read accordingly.

1.3 DEFINITIONS

.1 Refer to Section 01 42 16, Definitions. The following are definitions of words found in mechanical 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 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 mechanical 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

.9 “Equal to” – if products supplied by an “Equal to” manufacturer are proposed for use the “Equal to” product must be equivalent in quality, size and weight, performance, and operating characteristics (including energy efficiency), to the specified product, and acceptance or rejection of an “Equal to” product will be made by the Consultant

.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 is "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 is "approved by", "inspected by", etc., the Consultant.

.4 In the mechanical specification, singular may be read as plural, and vice-versa.

1.4 SUBMITTALS

.1 Refer to Section 01 78 39, Project Record Documents. As specified in this section, submit the following to the Consultant:

.1 project close-out documentation: operation and maintenance manuals, record as-built drawings, and all associated data

.2 progress payment breakdown: a detailed breakdown of the mechanical Work cost

.3 Extended Warranties: copies of all extended warranties specified, dated, signed, and in the name of the Owner

1.5 JOURNEYMAN/APPRENTICE TRADESMEN

.1 All mechanical Work is to be done by tradesmen who perform only the Work that their certificates permit. Apprentice tradesmen must Work under direct on-site supervision of an experienced journeyman tradesman.

.2 Unless otherwise specified, the journeyman/apprentice ratio is to be in accordance with governing regulations.

1.6 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 the building permit is obtained, or at the time of bid closing for the Project, whichever comes first.

.2 All Work is to be in accordance with requirements with codes, regulations, and standards applied by governing authorities Included but not limited to the following:

1) Ontario Building (OBC)

2) Ontario Fire Code (OFC)

3) Ontario Electric Safety Code (OESC)

4) Canadian Standards Association (CSA)

5) Underwriters Laboratory Canada (ULC)

6) National Fire Prevention Association (NFPA)

7) Factory Mutual (FM)

.3 All mechanical piping system Work, including equipment, must comply in all respects with requirements of local technical standards authorities and CSA B51, Boiler, Pressure Vessels and Pressure Piping Code. Pressure vessels and fittings defined in Clause 4.3 of CSA B51 must bear a Canadian Registration Number (CRN).

.4 Where any governing code, regulation, or standard requires preparation and submission of applications, special details, or drawings for review, prepare and submit them. Pay all associated costs associated with these submittals.

.5 All electrical items associated with mechanical equipment are to be certified and bear the stamp or seal of a recognized testing agency such as CSA, UL, ULC, or ETL, or bear a stamp to indicate special electrical utility approval.

.6 Requirements of the Contract Documents are to take precedence when they are more stringent than codes, ordinances, standards, and statutes.

1.7 IMPERIAL AND METRIC MEASUREMENTS

.1 Conform to requirements of CAN/CSA-Z234.1, Canadian Metric Practice Guide.

1.8 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.

1.9 DRAWINGS AND SPECIFICATION

.1 The mechanical drawings are performance drawings, diagrammatic, and show approximate locations of equipment and connecting services. Any information regarding accurate measurement of the building is to be taken at the site.

.2 The mechanical 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.

.3 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.

.4 The mechanical 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.

.5 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.

.6 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.

1.10 PLANNING AND LAYOUT OF THE WORK, AND ASSOCIATED DRAWINGS

.1 Properly plan, coordinate, and establish the locations and routing of services with all trades 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") diameter and larger

.3 electrical cable tray and bus duct

.4 conduit 100 mm (4") diameter and larger

.5 piping less than 100 mm (4") diameter

.6 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 piping, ductwork, 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 Locate all shut-off valves, balancing devices, air vents, equipment, and similar products, particularly such products located above suspended ceilings, for easy access for servicing and/or removal.

.4 Layout Drawings: Prepare layout drawings for mechanical Work with locations of equipment and routing of services generally in accordance with the Contract Documents. Confirm inverts, coordinate with and make allowances for the Work of other trades, accurately layout the Work, and be entirely responsible for all Work installed in accordance with layout drawings. Where any invert, grade, or size is at variance with the Contract Documents, notify the Consultant prior to proceeding with the Work.

.5 Interference Drawings: Prepare dimensioned working interference drawings, supplementary to the Contract Documents, for all areas where multiple services and/or equipment occur, or where the Work due to architectural and structural considerations requires special study and treatment. Review interference drawings with the Consultant before the Work is installed. Where your Work has been installed in such areas without preparation of interference drawings and conflicts occur, revise your Work to suit at no additional cost.

1.11 GENERAL RE: INSTALLATION OF EQUIPMENT

.1 Unless otherwise specified or indicated, install all equipment in accordance with the equipment manufacturer’s recommendations and instructions. Governing codes, standards, and regulations take precedence over manufacturer’s instructions.

1.12 PERMITS AND FEES

.1 Apply for, obtain and pay for all permits required to complete the mechanical Work.

1.13 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 1 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 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, and not previously identified, 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.

1.14 SHOP DRAWINGS AND PRODUCT DATA SHEETS

.1 Submittals under all Division 20 shall be in accordance with General Conditions and section 01 33 00 – Submittal Procedures.

.2 Submit for review, shop drawings and/or product data sheets indicating in detail the design, construction, and performance of products as requested in sections of this specification. The number of copies of shop drawings and/or product data sheets will be as later directed.

.3 Shop drawings are those prepared specifically for the project. Product data sheets are copies of manufacturer’s standard catalogue, etc., literature.

.4 Unless otherwise specified or required, submit shop drawings/product data sheets via email in PDF format only.

.5 Shop drawings and product data sheets must confirm that the product proposed meets all requirements of the Contract Documents.

.6 Identify each shop drawing or product data sheet with the project name and the product drawing or specification reference, i.e. "Exhaust Fan EF-1".

.7 Endorse each copy of each shop drawing or product data sheet “correct for review by consultant”, or "certified to be in accordance with all requirements" and include your company name, the submittal date, and the signature of an officer of your company to indicate your review and approval.

.8 The Consultant will retain 1 or 2 copies of each shop drawing or product data sheet submission.

.9 The following is to be read in conjunction with the wording on the Consultant’s review stamp applied to each shop drawing or product data sheet submitted:

.10 "This review is for the sole purpose of ascertaining conformance with the general design concept. This review does not approve the detail design inherent in the shop drawings, responsibility for which remains with the Contractor, and such review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. Be responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the Work of all sub-trades."

1.15 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, 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, 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 and labour costs are not to exceed those published in local estimating price guides, less applicable trade discounts, and labour 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

.3 costs for rental tools and/or equipment are not to exceed local rental costs

.4 if overhead and profit percentages are not specified in the General Conditions of the Contract, Supplementary Conditions, or elsewhere in the Specification, but allowable under the Contract, then allowable percentages for overhead and profit are to be 20% for overhead and 10% for profit

.5 the overhead percentage will be deemed to cover all quotation costs other than actual site labour, product and materials and rentals

.6 all quotations, including those for deleted Work, must include a figure for any required change to the Contract time.

.4 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.

1.16 SCAFFOLDING, RIGGING, AND HOISTING

.1 Unless otherwise specified or directed, supply, erect and operate all scaffolding, rigging, hoisting equipment and associated hardware required for your Work. Immediately remove from the site all scaffolding, rigging, and hoisting equipment when no longer required.

.2 Do not place major erection loads on any portion of the structure without approval from the Consultant.

.3 Submit for review, rigging and hoisting plans, contemplated dates, permits, equipment, safety measures, and personnel prior to hoisting operations.

1.17 PROJECT CLOSEOUT SUBMITTALS

.1 Refer to Section 01 77 00, Closeout Procedures.

.2 Prior to application for Substantial Performance, submit all required items and documentation specified, including the following:

.1 Operating and maintenance manuals

.2 as-built record drawings and associated data

.3 extended warranties for equipment as specified

.4 final commissioning report and TAB report

.5 identified keys for mechanical equipment and/or panels for which keys are required, and all other items required to be submitted

.6 other data or products specified

.3 Operating and maintenance manuals: Submit 3 hard copies of operating and maintenance manuals consolidated in hardcover 3 "D" ring binders, each binder sized to include approximately 25% spare space for future data, and identified permanently with the project name, "mechanical operating and maintenance manual" wording, and the date. Manuals are to include the following:

.1 an Introduction sheet listing the Consultant's, Contractor's, and Subcontractor names, street addresses, telephone and fax numbers, and e-mail addresses

.2 a Table of Contents sheet, and corresponding index tab sheets

.3 a copy of each shop drawing or product data sheet, with manufacturer's/supplier's name, telephone and fax numbers, email address, and the email address for local source of parts and service

.4 pressure test reports, and certificates issued by governing authorities

.5 Operating Data: Operating data is to include:

.1 a description of each system and its controls

.2 control schematics for equipment/systems including building environmental controls

.3 if applicable, the building automation system (BAS) architecture and all required operating data

.4 description of operation of each system at various loads together with reset schedules and seasonal variances

.5 operation instructions for each system and each component

.6 description of actions to be taken in event of emergencies and/or equipment failure

.7 valve tag schedule, and flow diagrams to indicate valve locations

.6 Maintenance Data: Maintenance data is to include:

.1 servicing maintenance, operation and trouble-shooting instructions for each item of equipment and each system

.2 schedules of tasks, frequency, tools required, and estimated task time

.3 complete parts lists with numbers

.7 Performance Data: Performance data is to include:

.1 equipment and system start-up data sheets

.2 equipment performance verification test results, and final commissioning report

.3 final testing adjusting and balancing reports

.8 Review Submittal: Assemble one copy of the operating and maintenance manual and submit to the Consultant for review prior to Owner training and instructions and assembling the remaining copies. Incorporate all comments into the final submission.

.9 Digital O & M Manuals: Submit 4 digital versions of the hard copy manual using the latest version of Adobe Acrobat Portable Document Format and enhanced with bookmarks, internet links, and internal document links. The digital copies are to be copied to CDR with custom labels which indicate the project name, date, the Consultant's name, and "Operating & Maintenance Manual for Mechanical Systems".

.4 Record "as-built" Drawings and Data: As Work progresses at the site, clearly mark in red in a neat and legible manner on a set of white prints of the Contract Drawings, all significant changes and deviations from the routing of services and locations of equipment shown on the Contract Drawings and resulting from the issue of Addenda, Site Instructions, Change Orders, and job conditions. Use notes marked in red as required. Maintain the white print red line as-built set at the site for the exclusive use of recording as-built conditions, keep the set up-to-date at all times, and ensure that the set is always available for periodic review. The as-built set is also to include the following:

.1 the dimensioned location of all inaccessible concealed Work

.2 the locations of control devices with identification for each

.3 the location of all piping system air vents and water hammer arrestors

.4 the location and tag identification for all tagged valves

.5 for underground piping, including service entrance/exit piping, record dimensions, invert elevations, all offsets, fittings, cathodic protection and accessories if applicable, and locate dimensions from benchmarks that will be preserved after construction is complete

.6 for fire protection systems, record actual locations of equipment, sprinkler heads, and valves, drains, and test locations, and deviations of pipe routing and sizing from that shown on the drawings

.7 the location of all concealed services terminated for future extension

.5 Digital Record "as-built" Drawings: When Work on site is complete, transfer all the as-built red line information from the site as-built drawings to a recordable and identified CAD disc with CAD Work of equal quality to the Contract Drawings. Obtain a CAD disc as described below.

.6 Obtaining CAD Digital Files: The mechanical drawings have been prepared on a CAD system using the latest Release of AutoCad software. For the purpose of producing final as-built drawings, digital files of the Contract Drawings will be supplied by the Consultant for a nominal fee.

.7 Review and Submittal: Prior to inspection for Substantial Performance of the Work, submit for review, the red line site as-built white prints, a CAD digital file of the as-built drawings, and a bound set of white prints (of equal quality to the Contract Drawings) made from the digital file. The Consultant will review the drawings and, if necessary, return the disc and the marked-up white prints for corrections or further revisions, in which case complete the corrective and/or revision Work and resubmit the disc and white prints until they are determined to be acceptable, all prior to issue of a Certificate of Substantial Performance.

1.18 PROGRESS PAYMENT BREAKDOWN

.1 Submit, prior to submittal of the first progress payment draw, a breakdown of the cost of the mechanical Work to assist the Consultant in reviewing and approving monthly progress payment claims.

.2 The payment breakdown is subject to the Consultant's approval and progress payments will not be processed until an approved breakdown is in place. The breakdown is to include one-time claim items such as mobilization and demobilization, insurance, bonds (if applicable), shop drawings and product data sheets, commissioning including testing, adjusting and balancing, and project closeout submittals.

.3 Equipment, material and labour costs are to be indicated for site services (if applicable), plumbing and drainage, fire protection, mechanical piping, mechanical sheet metal, controls, and insulation Work, etc., in the same manner as they will be indicated on the monthly progress draw.

1.19 EXTENDED WARRANTIES

.1 All extended warranties specified in mechanical Work sections of the specification are to be full parts and labour warranties, at the site, and in accordance with requirements of the Contract warranty, but direct and in writing from the equipment manufacturer/supplier to the Owner.

.2 Submit signed and dated copies of extended warranties which clearly state requirements specified above.

1.20 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. 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.

1.21 PHASING OF THE WORK

.1 Phasing of the Work is required to maintain the existing building in operation, all as specified in Division 01. Include all costs for phasing the Work including all required "off hours" premium time labour costs.

1.22 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.

1.23 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 mechanical Work Sections in accordance with the following requirements:

.2 submit a copy of each equipment/system manufacturer's blank start-up report sheet to the Consultant for review, and incorporate any comments

.3 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

1.24 EQUIPMENT AND SYSTEM COMMISSIONING

.1 After successful start-up and prior to Substantial Performance, commission the mechanical Work in accordance with requirements of CSA Z320, Building Commissioning. Use commissioning sheets included with the CSA Standard, and any supplemental commissioning sheets required. Submit final commissioning data sheets, TAB reports, project closeout documents, and other required submittals.

1.25 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 mechanical Work sections of the specification. All demonstrations and training is to be performed by qualified technicians employed by the equipment/system manufacturer/supplier. The number of hours of training and the number of Owner's personnel to be involved will be specified in the mechanical Work sections to which this section applies.

.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, performance curves, 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 Training Session DVD: For equipment/system demonstration and training sessions as specified in mechanical Work Sections, submit an identified DVD of the session prepared by a professional photographer with construction project technical training session experience.

.7 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.

2 PRODUCTS

NOT APPLICABLE

3 EXECUTION

NOT APPLICABLE

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This section specifies products, common criteria and characteristics, and methods and execution that are common to one or more mechanical 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 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Submit product data sheets for:

.1 pressure gauges and thermometers

.2 strainers

.3 drain valves

.4 flexible connections

.5 equipment support assemblies, other than concrete pads

.3 Samples:

.1 submit a sample of each proposed type of access door, and samples of materials and any other items as specified in mechanical Work sections of the specification

.4 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

.5 List of equipment nameplates: submit a list of equipment identification nameplates indicating proposed wording and sizes

.6 Pipe & duct identification: submit a list of pipe and duct identification colour coding and wording

.7 Valve tag chart: submit a proposed valve tag chart and a list of proposed valve tag numbering and identification wording

.8 Waste management and reduction plan: submit a waste management and reduction plan prior to commencing Work and as per requirements specified in this section

.9 Drive belts: as specified in part 2 of this section, submit a spare belt set, tagged and identified, for each belt driven piece of equipment

.10 Additional submittals: submit any other submittals specified in this section or other mechanical Work sections of the specification

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 As listed in materials specified in this section.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Firestopping And Smoke Seal Materials:

.1 Firestopping and smoke seal system materials for mechanical penetrations through fire rated construction are specified in the mechanical Work section entitled Firestopping and Smoke Seal Systems and the Work is to be done as part of the mechanical Work.

.2 Waterproofing Seal Materials:

.1 Modular, mechanical seal assemblies 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.

.3 Pipe 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 pipe sleeve or building surface opening, and to fit tightly around the pipe or pipe insulation.

.4 Piping Hangers And Supports:

.1 General: Pipe hanger and support materials, including accessories, are to be, unless otherwise specified, in accordance with the Manufacturers Standardization Society (MSS) Standard Practice Manual SP-58, Pipe hangers and Supports-Materials, Design and Manufacture, and where possible, MSS designations are indicated with each product specified below. Conform to the following requirements:

.1 Unless otherwise specified, all ferrous hanger and support products are to be electro-galvanized.

.2 Hangers and supports for insulated piping are to be sized to fit around the insulation and the insulation jacket.

.2 Horizontal Suspended Piping: Hangers and supports are to be:

.1 Adjustable steel clevis hanger – MSS Type 1.

.2 Adjustable swivel ring band type hanger – MSS Type 10.

.3 Horizontal Pipe On Vertical Surfaces: Epoxy coated steel pipe stays are not permitted. Supports are to be:

.1 Carbon steel offset pipe clamp to support pipe away from the support surface.

.2 Heavy-duty steel pipe bracket – MSS type 26.

.3 Single steel pipe hook .

.4 Floor Supports For Vertical Risers: Supports are to be:

.1 Copper tubing riser clamp (plastic coated) – MSS Type 8.

.2 Heavy-duty steel riser clamp – MSS Type 8.

.5 Vertical Piping on Vertical Surfaces: Epoxy coated steel pipe stays are not permitted. Supports are to be:

.1 Carbon steel offset pipe clamp to support pipe away from the support surface.

.2 Heavy-duty steel pipe bracket or soil pipe bracket – MSS Type 26.

.3 Extension split pipe clamp – MSS Type 12.

.4 For piping on an existing roof – equal to Portable Pipe Hangers (Canada) Inc. "PP" Series prefabricated portable pipe support system components to suit the pipe, complete with all required accessories including bases, galvanized structural steel frames, and galvanized steel pipe hangers and/or supports conforming to MSS SP-58.

.5 For plastic piping above ground – generally as specified above but in accordance with the pipe manufacturer's printed recommendations.

.6 For bare horizontal copper piping – generally as above but factory vinyl coated to prevent direct copper/steel contact.

.7 For bare copper vertical piping – corrosion resistant ferrous clamps with flexible rubber gasket type material (not tape) to isolate the pipe from the clamp.

.8 Insulation protection shields to & including 40 mm (1½") diameter – galvanized steel shields with ribs to keep the shield centred on the hanger – MSS SP-58 Type 40.

.6 Hanger Rods: Electro-galvanized carbon steel (unless otherwise specified), round, threaded, complete with captive machine nuts with washers at hangers, sized to suit the loading in accordance with Table 3 in MSS SP-58, but, in any case, minimum 9.5 mm (3/8") diameter and in accordance with ASTM A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength, and ASME B18.31.3, Threaded Rods (Inch Series).

.5 Equipment Bases And Supports:

.1 Concrete Housekeeping Pads: Unless otherwise specified, shown or required, minimum 100 mm (4") high reinforced concrete housekeeping pads 200 mm (8") clear of the equipment on each side and end, or a minimum of 200 mm (8") from the centreline of equipment anchor bolts to the edge of the base, whichever is larger. Conform to the following requirements:

.1 Supply dimensioned drawings and equipment base templates, and provide anchor bolts for proper setting and securing of equipment on pads.

.2 Place anchor bolts during the concrete pour and be responsible for all required levelling, alignment, and grouting of the equipment.

.3 As a minimum, use wire mesh reinforcement, however, for pads for large heavy equipment, use reinforcement as per structural drawing details.

.2 Roof or Grade Metal Frame Supports: Equal to Eco Support Products “EcoFoot-EcoFrame metal framework support assemblies, each sized to suit the equipment to be mounted and consisting of UV stabilized rubber base mats, support legs adjustable from 300 mm to 450 mm (12” to 18”), galvanized steel fixings for the tubing framework, 15 mm (½”) diameter bolts, 50 mm (2”) square hot dipped galvanized mild steel tubing.

.3 Structural Steel Stands/Supports: For equipment not designed for base mounting, where required, provide welded or bolted, cleaned and galvanized, prime coat painted structural steel stands or supports conforming to the following requirements:

.1 All stands and supports, except those for small equipment, are to be designed by a structural engineer registered in the jurisdiction of the Work, and stamped and signed design drawings with calculations are to be submitted as shop drawings for review.

.2 All steel stands are to be flange bolted to concrete housekeeping pads.

.6 Piping Strainers – “Y” Shaped:

.1 Wye shaped strainers, bronze with sweat type or flanged connections in copper piping, cast iron with screwed, flanged, or grooved end connections in steel piping, minimum 1725 kPa (250 psi) rated and complete with a removable perforated type 304 stainless steel 20 mesh screen, and, for strainers 40 mm (1½") diameter and larger, a blow down pipe connection tapping.

.7 Piping Drain Valves:

.1 Minimum 2070 kPa (300 psi) water rated, 20 mm (¾") diameter, straight pattern full port bronze ball valves, each complete with a lever handle, threaded outlet suitable for coupling connection of 20 mm (¾") diameter garden hose, and a cap and chain.

.8 Pressure Gauges And Thermometers:

.1 Pressure Gauges: Adjustable, glycerine filled, stainless steel,100 mm or 115 mm (4" or 4½") diameter, in accordance with requirements of ASME B40.100, Pressure Gauges and Gauge Attachments, complete with a dual scale white dial with a scale range such that the working pressure of the system is at the approximate mid-point of the scale, each accurate to within 1% of scale range, and with additional accessories/requirements as follows:

.1 A bronze ball type shut-off valve in the piping to each pressure gauge.

.2 A brass pressure snubber for each pressure gauge for piping and equipment with normal everyday flow.

.3 Wetted parts of pressure gauges in domestic water piping are to be ANSI/NSF 61 certified lead free.

.2 Thermometers: Round, adjustable, hermetically sealed stainless steel, 125 mm (5") diameter, adjustable (90°) angle bimetal dial type thermometers in accordance with requirements of ASME B40.200, Thermometers, Direct Reading and Remote Reading, each complete with:

.1 A white aluminum dual scale dial with black and blue markings and a range such that the working temperature of the system is the approximate mid-point of the scale.

.2 A suitable thermowell.

.3 For thermometers in domestic water piping, ANSI/NSF 61 lead free certification.

.9 Electric Motors:

.1 Unless otherwise specified, motors are to conform to EEMAC Standard MG1, applicable IEEE Standards, and applicable CSA C22.2 Standards, and are to meet NEMA standards for maximum sound level ratings under full load. Confirm motor voltages prior to ordering.

.2 Vertically mounted and submersible motors are to be purposely designed for mounting in this attitude.

.3 AC Motor Efficiency: The efficiency of single phase AC motors to 1 HP is to be in accordance with CAN/CSA C747. The efficiency of all three phase motors 1 HP and larger is to be in accordance with CAN/CSA C390 or IEEE 112B.

.4 Single Phase AC Motors: Unless otherwise specified, AC motors smaller than ½ HP are to be 115 volt, continuous duty capacitor start type with an EEMAC 48 or 56 frame size, solid base, heavy-gauge steel shell with solid die-cast end shields, dynamically balanced die-cast rotor, integral automatic reset thermal overload protection, Class "B" insulation, and a 1.15 service factor at 40°C (105°F) ambient temperature.

.5 Two-Speed AC Motors: Two-speed motor(s) are to be as specified above but two-speed, single or double winding type as specified and/or scheduled.

.6 Motors for VFD's: Motors for equipment with variable frequency drives are to be generally as specified above but inverter duty type to NEMA Standard MG-1, Section IV, Part 31, quantified by CSA for operation from a variable frequency drive of the type specified, and complete with Class "H" insulation and a shaft grounding bearing protection ring.

.7 Corrosion Protection: Motors for equipment which is scheduled or specified with a corrosion resistant coating or constructed from corrosion resistant materials are to be factory coated with a primer and epoxy paint finish.

.8 Acceptable Manufacturers: Acceptable motor manufacturers are:

.1 Westinghouse Canada Inc.

.2 Canadian General Electric

.3 Baldor Electric Co.

.4 U.S. Electrical Motors

.5 Weg Electric Corp.

.6 Marathon Electric

.7 Magna-Tech Canada

.8 Toshiba Corp.

.9 Leeson Canada

.10 Motor Starters And Accessories:

.1 Loose motor starters and accessories, disconnect switches, and motor control centres for mechanical equipment will be provided as part of the electrical Work.

.11 Mechanical Work 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 damper motors and control valves, 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 in accordance with existing identification at site. 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. Fan EF-1, 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 Valve Tags: Coloured, 40 mm (1½") square, 2-ply laminated plastic with bevelled edges, red-white, green-white, yellow-black, etc., to match the piping identification colour, each complete with a 3.2 mm (1/8") diameter by 100 mm (4") long brass plated steel bead chain, and four lines of engraved maximum size identification wording, i.e.:

.1 VALVE V2

.2 100 mm (4")

.3 CHILL. WATER

.4 NORMALLY OPEN

.3 Standard Pipe Identification: Standard pipe identification is to be equal to Smillie McAdams Summerlin Ltd. or Brady vinyl plastic with indoor/outdoor type vinyl ink lettering and directional arrows, as follows:

.1 For pipe to and including 150 mm (6") diameter, coiled type snap-on markers of a length to wrap completely around the pipe or pipe insulation.

.2 For pipe larger than 150 mm (6") diameter, saddle type strap-on markers with 2 opposite identification locations and complete with nylon cable ties.

.4 Standard Pipe Identification Wording and Colours: Identification wording and colours for pipe identification materials are to be as follows:

PIPE SERVICE	IDENTIFICATION COLOUR	LEGEND
domestic cold water	green	DOM. COLD WATER
domestic hot water supply	green	DOM. HW SUPPLY
sanitary drainage	green	SAN.
plumbing vent	green	SAN. VENT
natural gas	to Code	to Code, c/w pressure
natural gas vent	to Code	to Code
glycol heating supply	yellow	GLY. HTG. SUPPLY
glycol heating return	yellow	GLY. HTG. RETURN
glycol heating drain	yellow	GLY. HTG. DRAIN

.5 Colours For Legends & Arrows: Colours for pipe identification legends and directional arrows are to be as follows:

IDENTIFICATION COLOUR	LEGEND & ARROW COLOUR
yellow	black
green	white
red	white

.12 Flexible Connectors:

.1 Double wall stainless steel flexible connectors for piping connections to vibration isolated equipment, each selected by the manufacturer to suit the application. Shop drawings or product data sheets must indicate construction and performance requirements that suit the application. Acceptable manufacturers are:

.1 Hyspan Precision Products Inc.

.2 Senior Flexonics Ltd.

.3 The Metraflex Co.

3 EXECUTION

3.1 INSTALLATION

.1 General Piping And Ductwork Installation Requirements:

.1 Unless otherwise specified, locate and arrange horizontal pipes and ducts 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. If required to maintain ceiling heights, reroute and/or resize ductwork, with Consultant's approval.

.2 Unless otherwise specified, install all Work 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 Install all pipes and ducts parallel to building lines and to each other.

.4 Neatly group and arrange all exposed Work.

.5 Service and Maintenance Access: Locate all Work to permit easy access for service or maintenance as required and/or applicable. Locate all valves, dampers and any other equipment 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 valves, dampers and similar piping or ductwork accessories occur in vertical services in shafts, pipe spaces or partitions, locate the accessories at the floor level.

.6 Dissimilar Metal Pipe Connections: Make all connections between pipes of different materials using proper approved adapters. Provide cast brass dielectric type adapters/unions at connections between ferrous and copper pipe.

.7 Cleaning: Carefully clean all ducts, pipe and fittings prior to installation. Temporarily cap or plug ends of pipe, ducts and equipment which are open and exposed during construction.

.8 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.

.9 Piping Rust and Dirt: Any ferrous piping that exhibits in excess of 5% surface rust, either inside or outside or both is to be wire brush cleaned to bare metal and coated with suitable primer. Steel pipe, fittings and accessories are to be free of corrosion and dirt when Work is complete or prior to being concealed from view. Where dirt is evident, clean the piping prior to being concealed.

.10 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.

.11 Unions and Flanges: Whether shown or specified on the drawings or not, provide screwed unions or flanges in all piping connections to equipment, and in regular intervals in new piping runs in excess of 12 m (40') to permit removal of sections of piping.

.12 Elbows and Eccentric Reducers: Unless otherwise specified and except where space limitations do not permit, all piping elbows are to be long radius. Eccentric reducers are to be installed with the straight side at the top of the piping.

.2 Pipe Joint Requirements:

.1 Do not make pipe joints in walls or slabs.

.2 Ream all piping ends prior to making joints.

.3 Screwed Steel Piping: Properly cut threads in screwed steel piping and coat male threads only with Teflon tape or paste, or an equivalent thread lubricant. After the pipe has been screwed into the fitting, valve, union, or piping accessory, not more than 2 pipe threads are to remain exposed.

.4 Welded Steel Piping: Site bevel steel pipe to be welded or supply mill bevelled pipe. Remove all scale and oxide from the bevels and leave smooth and clean. Use factory made welding tees or welding outlet fittings for piping branches off mains. Do not use shop or site fabricated fittings unless written approval has been obtained.

.5 Welding Requirements: Welding is to be TSSA registered. Welded joints are to be made by CWB certified, licensed journeyman welders qualified in accordance with CSA B51, Boiler Pressure Vessel and Pressure Piping Code, and who are in possession of a proper certificate of qualification for each procedure to be performed. Each weld is to be identified with the welder's identification symbol, and welds are not to be concealed until they have been inspected and approved. Electrodes are to be in accordance with CSA W48 Series, Electrodes, and requirements of CAN/CSA W117.2, Safety in Welding, Cutting and Allied Processes are to be followed.

.6 Weld Testing Requirements: Include (and pay for) magnetic particle testing of 10% of the welds in piping systems indicated below. Testing is to be done by a specialist qualified in accordance with CSA W178.1 and CSA W178.2 and approved by the Consultant. Testing is to be done to ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51, and requirements of governing authorities. Systems to be tested are as follows:

.1 DHW Solar Thermal

.7 Flanged Joints: Unless otherwise specified, make all flanged joints with EDPM gasket materials to suit the application, and bolts and nuts. Bolts are not to be longer than the length necessary to screw the nut up flush to the end of the bolt. Bolts used for flanged connections in all piping with a working pressure of 690 kPa (100 psi) and greater are to be ASTM A-193, Grade B-7, with heavy hexagon nuts to ASTM A-194, CL-2H. Provide suitable washers between each bolt head and the flange and between each nut and the flange.

.8 Examination of Flanged Joints: A random check of bolted flanged connections will be made to verify that flanged connections are properly mated with no shear force acting on bolts. Supply all labour to disconnect and reconnect the selected flanged joints. If improperly mated joints are found, remove and reinstall the affected piping so that the flanges mate properly. If improperly mated joints are found, additional joints will be checked, and you will be responsible for the repair of any other improper joints discovered.

.9 Soldered Joints: Unless otherwise specified make all soldered joints in copper piping using flux suitable for and compatible with the type of solder being used. Clean the outside of the pipe end and the inside of the fitting, valve, or similar accessory prior to soldering. Comply with requirements of ASTM B828, Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.

.10 Mechanical Joints: Install mechanical joint fittings and couplings in accordance with the manufacturer's instructions.

.11 Grooved Pipe & Coupling Joints: Make arrangements with the coupling and fitting manufacturer for shop and/or site instructions and demonstrations as required, and adhere to the manufacturer's instructions with respect to pipe grooving, support, type of gasket required, anchoring and guiding the grooved piping system.

.12 Pressure Crimped Piping Joints: If pressure crimped couplings and fittings are used, ensure that gaskets are fully compatible with the piping fluid, and that all valves and piping accessories are suitable. Use only fitting manufacturer supplied crimping equipment. Comply with the manufacturer’s latest published specification, instructions, and recommendations with respect to pipe, coupling, and fitting preparation and installation, and support, anchoring and guiding of the piping system.

.13 PVC Piping Solvent Weld Joints: Solvent weld PVC piping in 2 parts, primer stage and cementing stage, in accordance with the manufacturer’s recommendations, ASTM D2855, and CSA requirements.

.14 PVC Piping Gasketed Joints: Install PVC piping with gasketed joints in accordance with the manufacturer’s current published specifications, instructions and recommendations, and CSA requirements.

.3 Installation Of Waterproof Mechanical Seals:

.1 Provide watertight link type mechanical seals in exterior wall openings where shown or specified.

.2 Assemble and install each mechanical seal in accordance with the manufacturer's instructions.

.3 After installation, periodically check each mechanical seal installation for leakage and, if necessary, tighten link seal bolts until the seal is completely watertight.

.4 Installation Of Pipe Escutcheon Plates:

.1 Provide escutcheon plates suitable secured over all new exposed piping 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 pipe sleeves and/or openings, except where waterproof sleeves extend above floors, in which case the plate is to fit tightly around the sleeve.

.5 Installation Of Fastening And Securing Hardware:

.1 Provide all fastening and securing hardware required for mechanical Work to maintain installations attached to the structure or to finished floors, 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 the 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 that is to support the products. Provide reinforcing or connecting supports where required to distribute the loading to the structural components. Submit support details for review prior to installation.

.4 Obtain written consent before using explosive actuated fastening devices. If consent is obtained, comply with requirements of CSA Standards CAN3-Z166.1 and CAN3-Z166.2.

.6 Installation Of Pipe Hangers And Supports:

.7 Provide all required pipe hangers and supports.

.1 Provide any additional structural steel channels, angles, inserts, beam champs and similar accessories required for hanging or supporting pipe. Unless otherwise shown or specified, hang or support pipes from the structure only.

.2 For Insulated Pipe: Size the hanger or support to suit the diameter of the insulated pipe and install the hanger or support on the outside of the insulation and insulation finish.

.3 Horizontal Above Ground Piping: Unless otherwise shown or specified, hang and/or support horizontal pipe above ground by means of hangers and/or supports specified in Part 2 of this Section. Unless otherwise shown or specified, hangers for suspended pipe to and including 25 mm (1") diameter are to be clevis type or adjustable ring type, and hangers for suspended pipe 40 mm (1½") diameter and larger are to be adjustable clevis type. Space hangers and supports in accordance with the following:

.1 Cast iron pipe: hang or support at every joint with maximum 2.4 m (8') spacing.

.2 Plastic pipe: conform to pipe manufacturer’s recommended support spacing.

.3 Glass pipe: conform to pipe manufacturer’s recommended support spacing and support requirements.

.4 Copper and steel pipe: hang or support at spacing in accordance with the following schedule:

PIPE DIA.	MAX. SPACING STEEL (meters)	MAX. SPACING COPPER (meters)
to 25 mm (1")	2.4 m (8')	1.8 m (6')
40 mm (1½")	2.7 m (9')	2.4 m (8')
50 mm (2")	3.0 m (10')	2.7 m (9')
65 mm (2½")	3.6 m (12')	3.0 m (10')
75 mm (3")	3.6 m (12')	3.0 m (10')
90 mm (3½")	3.6 m (12')	3.6 m (12')
100 mm (4")	4.2 m (14')	3.6 m (12')

.5 Flexible grooved pipe/coupling joint piping: as above but with not less than 1 hanger or support between joints.

.6 Changes in direction: where pipes change direction, either horizontally or vertically, provide a hanger or support on the horizontal pipe not more than 300 mm (12") from the elbow, and where pipes drop from tee branches, support the tees in both directions not more than 50 mm (2") on each side of the tee.

.7 Grouped piping: when pipes with the same slope are grouped and a common hanger or support is used, space the hanger or support to suit the spacing requirement of the smallest pipe in the group and secure pipes in place on the common hanger or support.

.8 Roller hangers & supports: provide roller hangers or supports for all heat transfer piping 150 mm (6") diameter and larger and conveying a material 75° C (170° F) or greater to facilitate pipe movement due to expansion and contraction, and at each hanger or support tack weld a steel protection saddle to the pipe to protect the piping insulation.

.9 Inline centrifugal pumps: support piping at both sides of inline centrifugal pumps.

.4 Vertical Piping: Unless otherwise shown or specified, support vertical piping by means of supports specified in Part 2 of this Section, spaced in accordance with the following:

.1 Support vertical pipes at maximum 3 m (10’) intervals or at every floor, whichever is lesser.

.2 For sections of vertical piping with a length less than 3 m (10'), support the pipe at least once.

.3 For all vertical cast iron plain end pipe (mechanical joint type), secure the riser or pipe clamp around the pipe under a flange integral with the pipe for vertical support purposes, or provide a length of hub and spigot pipe to facilitate proper support.

.4 For all vertical steel pipe risers in excess of 3 m (10'), weld shear lugs to the pipe to carry the load.

.5 For vibration isolated piping risers, provide rubber-steel-rubber vibration isolation pads between the riser clamps and the floor.

.6 For piping subject to vertical movement exceeding 40 mm (1½”) due to vertical pipe expansion, provide suitable engineered constant support hangers.

.5 Piping On The Roof: Support piping on the roof as follows:

.1 On existing roof - provide support members as specified in Part 2 of this Section spaced as per the schedule above and of a type to suit the application, and, for each support, carefully scrape away the roofing gravel, bed the support in a heavy covering of roofing mastic, then scrape the gravel back up around the support - secure pipes to supports.

.6 Isolation for Bare Copper Tubing: Each hanger, support or securement for horizontal bare copper tubing is to be plastic coated to prevent direct contact between the pipe and the ferrous hanger. Each wall or floor clamp for vertical bare copper piping is to be isolated from the pipe by means of strips of flexible rubber inserts. The use of painted ferrous hangers and supports, including those painted with copper coloured paint, is not acceptable. Site application of tape or other types of isolation is not acceptable.

.7 Insulation Protection Shields: For insulated horizontal piping to and including 40 mm (1½") diameter, provide galvanized steel insulation protection shields between the insulation and the hanger or support. Install shields immediately after the pipe is insulated.

.8 Pipe Support from Steel Deck: Do not support piping from steel deck without written consent from the Consultant.

.8 Installation Of Pipeline Strainers:

.1 Provide strainers in piping systems where shown on the drawings.

.2 Equip each strainer with a construction screen and remove after piping has been flushed and cleaned. Install permanent screens/mesh.

.3 Provide isolating valves in piping a maximum of 3 m (10') from the strainer on each side of a strainer.

.4 For "Y" shaped strainers 40 mm (1½") diameter and larger, provide blow-off piping complete with a shut-off valve with cap and chain, and terminate blow-off piping downward in a vertical position.

.5 For duplex basket strainers, equip each chamber drain plug with valved drain piping.

.9 Installation Of Equipment Drains And Piping Drain Valves:

.1 Unless otherwise shown or specified, provide minimum 40 mm (1½") diameter type DWV copper drain piping from equipment overflows, condensate drain pans, pump bases, fresh air intake plenum drains, etc., to a floor drain location. Equip the drain piping with deep seal traps located in heated areas.

.2 Provide a drain valve at the bottom of piping risers, at all other piping low points, and wherever else shown and/or specified.

.3 Locate drain valves so that they are easily accessible.

.10 General Re: Installation Of Valves:

.1 Generally, valve locations are indicated or specified on drawings or specified in Sections of the Specification where the valves are specified, however, regardless of locations shown or specified, the following requirements apply:

.1 Provide shut-off valves to isolate all systems, at the base of all vertical risers, in branch take-offs at mains and risers on all floors, to isolate all equipment, to permit Work phasing as required, and wherever else required for proper system operation and maintenance.

.2 Install shut-off valves with handles upright or horizontal, not inverted, and located for easy access.

.3 Unless otherwise specified, provide a check valve in the discharge piping of each pump.

.4 Valve sizes are to be the same as the connecting pipe size.

.5 Valves are to be permanently identified with the size, manufacturer's name and figure number, and wherever possible, valves are to be the product of the same manufacturer.

.6 The manufacturer's name, valve model or figure number, and the pressure rating are to be clearly marked on each valve.

.7 For valves in insulated piping, the design of the valve stem, handle and operating mechanism is to be such that the insulation does not have to be cut or altered in any manner to permit valve operation.

.11 Installation Of Pressure Gauge & Thermometer Access Fittings:

.1 Provide pressure gauge and thermometer access fittings in 6.4 mm (¼") threaded opening fittings for insertion/removal of piping mounted pressure gauges and thermometers. Where piping is insulated, provide extended length access fittings to accommodate the insulation.

.2 Unless pressure gauges and/or thermometers are provided with equipment, provide access fittings in the following locations:

.1 In valved tubing across the suction, suction strainer (if applicable), and discharge piping of each circulating pump.

.2 In the supply and return piping connections to main mechanical plant equipment such as boilers, chillers, heat exchangers, main coils, etc.

.3 In expansion tank(s) or piping immediately at the expansion tank.

.4 In all water connections to hot water heaters.

.5 In the downstream side of mixing valves.

.6 In separate domestic hot water storage tank(s).

.7 At the topmost outlet in each standpipe fire protection system riser.

.8 In piping at each side of a pressure reducing valve.

.9 In domestic water service piping downstream of the meter.

.10 Wherever else shown and/or specified on the drawings or in the Specification.

.2 All metal surfaces that are in contact with domestic water are to be NSF/ANSI 61 certified.

.12 Installation Of Pressure Gauges And Thermometers:

.1 Pressure Gauges: Provide pressure gauges in the following locations:

.1 In valved tubing across the suction, suction strainer (if applicable), and discharge piping of each circulating pump.

.2 In the supply and return piping connections to main mechanical plant equipment such as boilers, chillers, heat exchangers, main coils, etc.

.3 In expansion tank(s) or piping immediately at the expansion tank.

.4 In separate domestic hot water storage tank(s).

.5 At the topmost outlet in each standpipe fire protection system riser.

.6 In piping at each side of a pressure reducing valve.

.7 In domestic water service piping downstream of the meter.

.8 Wherever else shown and/or specified on the drawings or in the Specification.

.2 Thermometers: Provide thermometers in the following locations:

.1 In supply and return piping connections to main mechanical plant equipment such as boilers, chillers, cooling towers, liquid to liquid heat exchangers, main coils, etc., unless temperature indication is supplied with the equipment.

.2 In all water piping connections to hot water heaters.

.3 In the downstream side of mixing valves.

.4 Wherever else shown and/or specified herein or on the drawings.

.3 Installation Requirements: Conform to the following installation requirements:

.1 For installation of thermometers in piping wells, provide a coat of metallic base heat transfer paste or grease in the piping well.

.2 For pressure gauges in piping at equipment locations, install the pressure gauge between the equipment and the first pipe fitting.

.3 Locate, mount and adjust all instruments so they are easily readable.

.4 Where pressure gauges and/or thermometers are located at high level or in an area where they cannot be easily seen, provide remote reading instruments.

.5 All metal surfaces that are in contact with domestic water are to be NSF/ANSI 61 certified.

.13 Mechanical Work Identification:

.1 Identify all new/relocated mechanical Work in accordance with existing identification standards at the site.

.2 Exposed Piping & Ductwork: Identify new exposed piping and ductwork as per Part 2 of this Section in locations such that it can be seen from the floor or service platforms, as follows:

.1 At every end of every piping or duct run.

.2 Adjacent to each valve, strainer, damper and similar accessory.

.3 At each piece of connecting equipment.

.4 On both sides of every pipe and duct passing through a floor, wall, or partition.

.5 At 6 m (20') intervals on pipe and duct runs exceeding 6 m (20’) in length.

.6 At least once in each room, and at least once on pipe and duct runs less than 6 m (20') in length.

.3 Concealed Piping & Ductwork: Unless otherwise specified identify new concealed piping and ductwork as per Part 2 of this Section in locations as follows:

.1 At points where pipes or ducts enter and leave rooms, shafts, pipe chases, furred spaces, and similar areas.

.2 At maximum 6 m (20') intervals on piping and ductwork above suspended accessible ceilings, and at least once in each room.

.3 At each access door location.

.4 At each piece of connected equipment, automatic valve, etc.

.4 Equipment: Provide an identification nameplate for each new piece of equipment, including items such as control valves, motorized dampers, instruments, and similar products. Secure nameplates in place, approximately at eye level if possible, with stainless steel screws unless such a practice is prohibitive, in which case use epoxy cement applied to cleaned surfaces. Locate all nameplates in the most conspicuous and readable location. Unless otherwise specified, equipment identification terminology is to be as per drawing identification.

.5 Natural And/Or Propane Gas Piping: Paint new gas piping with primer and two coats of yellow paint in accordance with Code requirements and requirements of the Painting section in Division 09. Identify the piping at intervals as specified above.

.6 Valve Tagging & Chart: Tag valves and prepare a valve tag chart in accordance with the following requirements:

.1 Attach a valve tag to each new valve, except for valves located immediately at the equipment they control.

.2 Prepare a computer printed valve tag chart to list all tagged valves, with, for each valve, the tag number, location, valve size, piping service, and valve attitude (normally open or normally closed).

.3 If an existing valve tag chart is available at the site, valve tag numbering is to be an extension of existing numbering and the new valve tag chart is to incorporate the existing chart.

.4 Frame and glaze one copy of the chart and, unless otherwise directed, affix to a wall in each main mechanical and/or equipment room.

.5 Include a copy of the valve tag chart in each copy of the operating and maintenance instruction manuals.

.6 Hand an identified and packaged (jewel case) compact disc of the valve tag chart to the Owner at the time the O & M Manuals are submitted.

.7 Ceiling Tacks or Stickers: Where new shut-off valves, control dampers, sensors, and similar items which will or may need maintenance and/or repair are located above accessible suspended ceilings, provide round coloured ceiling tacks in the ceiling panel material, or stickers equal to Brady "Quick Dot" on the ceiling grid material to indicate locations of the items. Unless otherwise specified, ceiling tack or sticker colours are to be as follows:

.1	HVAC piping valves and equipment	yellow
.2	Plumbing valves and equipment	green
.3	Control system hardware and equipment	orange

.14 System Flow Diagrams:

.1 Prepare AutoCAD, coloured, 1200 mm x 900 mm (48” x 36”) flow diagrams of mechanical systems to identify all equipment and valves.

.2 Install framed and glazed diagrams in equipment rooms housing the system equipment. Confirm location prior to installation.

.3 Include reduced size copies of the diagrams in each copy of the O & M Manuals.

.15 Pipe Leakage Testing:

.1 Before new piping has been insulated or concealed, and before equipment, fixtures and fittings have been connected, test all piping for leakage.

.2 Tests are to be witnessed by the Consultant and/or Owner's representative, and, where required, representatives of governing authorities. Give ample notice of tests in writing and verify attendance. Have completed test report sheets dated and signed by those present to confirm proper test results.

.3 When circumstances prevent scheduled tests from taking place, give immediate and adequate notice of cancellation to all who were scheduled to attend.

.4 Gravity Drainage & Vent Piping: Securely close all openings and pipe ends and fill piping with water up to the highest level, and ensure that the water stands at the same level for a minimum of 2 hours. After the fixtures and fittings are set and the pipes connected to the building drain or drains, turn on water into all pipe, fixtures, fittings and traps in order to detect any imperfect material or workmanship. Make a smoke test if required by the Municipality. At your option, drain and vent piping may be pressure tested with cold water at 345 kPa (50 psi) for 2 hours with zero leakage.

.5 Domestic Water Piping: Test piping with cold water at a pressure of 1½ times normal working pressure and maintain the pressure for a minimum of 2 hours.

.6 Heat Transfer (HVAC) System Piping: Test piping with cold water at a pressure of 1035 kPa (150 psi) for a minimum of 2 hours.

.7 Natural Gas Piping: Test piping in accordance with the requirements of CAN/CSA - B149.1. After completion of the verification test, locate the required tag stating the results of the verification test at the point of entry of the gas main into the building, affixed to the pipe in a secure manner. Check all piping joints and connections for leaks with a water/soap solution while the piping is under pressure.

.8 Propane Gas Piping: Test piping in accordance with the requirements of CAN/CSA -B149.2. After completion of the verification test, locate the required tag stating the results of the verification test at the point of entry of the gas main into the building, affixed to the pipe in a secure manner. Check all piping joints and connections for leaks with a water/soap solution while the piping is under pressure.

.9 General Re: All Testing: The following requirements apply to all testing:

.1 Ensure that all piping has been properly flushed, cleaned and is clear of foreign matter prior to pressure testing.

.2 Temporarily remove or valve off all piping system specialties or equipment which may be damaged by test pressures prior to pressure testing the systems, and flush piping to remove foreign matter.

.3 When testing is carried out below the highest level of the particular system, increase the test pressure by the hygrostatic head of 7 kPa (1 psi) for every 600 mm (24") below the high point.

.4 Include for temporary piping connections required to properly complete the tests.

.5 Piping under test pressure is to have zero pressure drop for the length of the test period.

.6 Make tight leaks found during tests while the piping is under pressure, and if this is impossible, remove and refit the piping and reapply the test until satisfactory results are obtained.

.7 Where leaks occur in threaded joints in steel piping, no caulking of these joints will be allowed under any conditions.

.8 Tests are to be done in reasonably sized sections so as to minimize the number of tests required.

.9 In addition to the leakage tests specified above, demonstrate proper flow throughout the systems including mains, connections and equipment, as well as proper venting and drainage, and Include for any necessary system adjustments to achieve the proper conditions.

.16 Supply Of Motor Starters And Accessories:

.1 Motor starters for mechanical equipment, except for starters integral with packaged equipment and starters factory installed in equipment power and control panels, will be provided as part of the electrical Work.

.17 Electrical Wiring Work for Mechanical Work:

.1 Unless otherwise specified or indicated, the following electrical wiring Work for mechanical equipment will 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 "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 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.

.8 120 volt power connections to electrical receptacles integral with small ceiling exhaust fans, including wiring through light switches or speed controllers.

.9 120 volt wiring connections to lighting fixture/switch combinations integral with air handling units.

.10 120 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 to be done as part of the electrical Work is to be installed in conduit and is to be done as part of the mechanical Work in accordance with wiring requirements specified for the electrical Work.

.18 Interruption To And Shut-Down Of Mechanical Services And Systems:

.1 Co-ordinate all shut-down and interruption to existing mechanical systems with the Owner. Generally, shut-downs 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 72 hours in advance of the proposed shut-down or interruption and obtain written approval to proceed. Do not shut-down 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.

.5 Pipe Freezing: Pipe freezing may be used to connect new piping to existing piping without draining the existing piping. Pipe freeze equipment is to be equal to "NORDIC FREEZE" CO^2 equipment supplied by Mag Tool Inc.

.19 Installation Of Equipment Bases And Supports:

.1 Concrete Housekeeping Pads: Unless otherwise specified, shown or required, set all floor or grade mounted equipment on reinforced concrete housekeeping pads.

.2 Steel Framework Supports: Where indicated, support base mounting smaller HVAC equipment such as heat pumps, condensing units, and fan equipment on galvanized steel adjustable tubular steel framework support assemblies.

.3 Structural Steel Stands/Supports: For equipment not designed for base mounting, where required, provide welded, cleaned and prime coat painted structural steel stands or supports flange bolted to concrete housekeeping pads.

.20 Concrete Work For Mechanical Equipment Bases/Pads:

.1 All concrete Work required for mechanical equipment bases/pads will be provided as part of the concrete Work of Division 03.

.2 Exactly locate bases/pads at the site and be present during the concrete pour to ensure that anchor bolts, inserts, plates and similar hardware are not damaged or dislodged.

.21 Concrete Work for Mechanical Equipment Bases/Pads:

.1 Provide all poured concrete Work, including reinforcing and formwork, required for mechanical equipment bases/pads.

.2 Concrete is to be minimum 20,700 kPa ready-mix concrete in accordance with CAN/CSA-A23.1 and the Building Code.

.22 Cutting And Patching for Mechanical Work:

.1 All cutting and patching of existing building surfaces required for mechanical 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 mechanical 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 for installation of the pipe, duct, etc., and insulation where necessary.

.23 Cutting, Drilling, and Patching for Mechanical Work:

.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 pipes pass through existing construction, core drill an opening. Size openings to leave 12 mm (½") clearance around the pipes or pipe insulation.

.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 pipe sleeve which is sized to leave 12 mm (½") clearance around the pipe or pipe insulation. Provide a pipe sleeve in the opening. Pipe 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.

.24 Packing And Sealing Core Drilled Pipe Openings:

.1 Pack and seal the void between the pipe opening and the pipe or pipe 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 sleeves water-tight with approved non-hardening silicone base caulking compound unless mechanical type seals have been specified.

.25 Cleaning Mechanical Work:

.1 Refer to cleaning requirements specified in Division 01.

.2 Clean all mechanical Work prior to application for Substantial Performance of the Work.

.26 Use Of Mechanical Systems For Temporary Heating:

.1 Each entire system is complete, pressure tested, cleaned, and flushed out.

.2 Specified water treatment system has been commissioned, and treatment is being continuously monitored.

.3 Building has been closed in and areas to be heated/ventilated are clean and will not thereafter be subjected to dust-producing processes.

.4 There is no possibility of damage from any cause.

.5 Supply ventilation systems are protected by minimum MERV 7 filters, which are to be inspected every other day, and changed every 2 weeks, or more frequently as required.

.6 Return air systems have approved construction filters over all openings, inlets, and outlets.

.7 All systems are operated as per the manufacturer's recommendations or instructions, and are monitored on a regular and frequent basis.

.8 Warranties are not affected in any way.

.9 Regular preventive and all other manufacturer's recommended maintenance routines are performed.

.10 Before substantial performance, each entire system is to be refurbished, cleaned internally and externally, restored to "as-new" condition, and filters in air systems replaced.

.11 Energy costs are to be paid by the Contractor.

.27 Maintaining Equipment Prior To Acceptance:

.1 Maintain all equipment in accordance with the manufacturer's printed instructions prior to start-up, testing and commissioning.

.2 Employ a qualified millwright to check and align shafts, drives, and couplings on all base mounted split coupled motor driven equipment.

.3 Where equipment lubrication fittings are not easily accessible, extend the fittings to accessible locations using copper or aluminium tubing.

.4 All filters are to be new upon Substantial Performance of the Work. This is in addition to any spare filters specified.

.28 Connections To Other Equipment:

.1 Carefully examine the Contract Documents during the bidding period and include for mechanical Work piping and/or ductwork connections to equipment requiring such connections.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This section specifies vibration isolation product requirements that are common to mechanical Work sections of the Specification and it is a supplement to each Section and is to be read accordingly.

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute / Sheet Metal and Air Conditioning Contractors' National Association (ANSI/SMACNA):

.1 ANSI/SMACNA – Seismic Restraint Manual-Guidelines for Mechanical Systems

.2 Canadian Standards Association (CSA):

.1 CAN/CSA-S832 – Seismic Risk Reduction of Operational and Functional Components (OFC's) of Buildings

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit copies of manufacturer's product data sheets for all products specified in this section. Product data sheets are to include product characteristics, limitations, dimension, finishes, and installation recommendations.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer's:

.1 Mechanical vibration isolation product manufacturers are to current members of the Vibration Isolation & Seismic Restraint Manufacturers Association.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Mason Industries Inc.

.2 Kinetics Noise Control Inc.

.3 The VMC Group

.4 Vibro-Acoutics

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 General:

.1 Vibration isolation products are to be in accordance with the drawing schedule and details, and as specified below.

.2 Springs: All springs are to be stable, colour coded, selected to operate at no greater than ⅔ solid load, designed in accordance with the Society of Automotive Engineers Handbook Supplement 9 entitled Manual on Design and Application of Helical and Spiral Springs, and with spring diameters in accordance with the manufacturer's recommendations to suit the static deflection and maximum equipment load.

.3 Finishes: All steel components of isolation products not exposed to the weather or moisture are to be zinc plated. All steel components of isolation products exposed to the weather or in a damp, moist environment are to be factory finished with rust inhibiting primer and fusion bonded epoxy, or hot dipped galvanized.

.4 Where the weight of isolated equipment may change significantly due to draining or filling with a liquid, vibration isolators are to be equipped with limit stops to limit spring extensions.

.2 Isolation Pads:

.1 Sandwich type pads, 20 mm (¾") nominal thickness, selected for 3.2 mm (1/8") static deflection unless otherwise specified, consisting of 2 waffle type or ribbed 50 durometer neoprene elastomer in-shear pads permanently bonded to a minimum #10 gauge steel plate, and complete with rubber bushed bolt holes and equipment anchor bolts with neoprene isolation grommets.

.3 Rubber Floor Isolators:

.1 Captive, bridge bearing quality neoprene mount selected for a minimum 4 mm (0.15") static deflection unless otherwise specified, with an integral cast or ductile iron housing and integral equipment anchor bolt.

.4 Spring Hangers:

.1 Welded steel plate housing with top and bottom rod mounting holes and spring retainer, neoprene double deflection isolation element, stable colour coded spring, and heavy-duty rubber washers.

.5 Neoprene Hanger Isolators:

.1 Neoprene double deflection rod isolators with steel housing and hanger rod bushing, selected for a minimum 4 mm (0.15") static deflection unless otherwise specified.

.6 Steel Equipment Base:

.1 Fully welded structural steel equipment and motor support bases, each complete with a wide flange steel frame, full depth cross members, brackets for spring mounts, and adjustable motor slide rails.

.7 Combination Steel /Concrete Inertia Equipment Base:

.1 Welded steel bases with a structural black steel channel frame, concrete reinforcing rods, bottom sheet steel pan, brackets for spring mounts welded to the frame and adjustable motor slide rails.

.8 Slung Steel Base:

.1 Slung steel bases of structural members with gusset plates welded to the ends and complete with adjustable motor slide rails and vertical section size to suit equipment’s motor power output.

3 EXECUTION

3.1 INSTALLATION

.1 Vibration Isolation Materials:

.1 Provide vibration isolation products for mechanical Work in accordance with the drawing schedule and details, and requirements specified herein and/or on the drawings.

.2 Supply to the vibration isolation product manufacturer or supplier a copy of a "reviewed" shop drawing or product data sheet for each piece of equipment to be isolated and dimensioned pipe layouts of associated piping to be isolated.

.3 Unless otherwise specified, all vibration isolation products are to be the product of one manufacturer.

.4 Ensure that the vibration isolation manufacturer coordinates material selections with equipment provided in order to ensure adherence to performance criteria. Allow for expansion and contraction when material is selected and installed.

.5 Maintain a minimum clearance of 50 mm (2”) between vibration isolated equipment and adjacent structures, piping, ductwork, conduit, and similar items.

.6 Isolation for Base Mounted Equipment: Unless otherwise indicated, install isolation materials for

.7 Isolation of Piping: Isolate all piping larger than 25 mm (1") dia. directly connected to motorized and/or vibration isolated equipment with 25 mm (1") static deflection spring hangers at spacing intervals in accordance with the following:

.1 For pipe to and including 100 mm (4") diameter – first three points of support.

.2 For pipe 125 mm (5") to 200 mm (8") diameter – first four points of support.

.3 For pipe 250 mm (10") diameter and larger – first six points of support.

.4 The first point of isolated piping support is to have a static deflection of twice the deflection of the isolated equipment but maximum 50 mm (2").

.5 Secure the top of the spring hanger frame rigidly to the structure, and do not install spring hangers in concealed locations.

.6 Where it is impossible to use at least two spring hangers, provide Senior Flexonics Ltd. Style 102 (or 102-U as required) or equal, twin sphere, moulded rubber flexible connection assemblies, selected by the manufacturer and suitable in all respects for intended application, and complete with required nipples and connections to provide proper vibration isolation.

.8 Control Wiring Connections: For all control wiring connections to vibration isolated equipment ensure that flexible metallic conduit with 90° bend is used for conduit 25 mm (1") diameter and smaller, and for conduit larger than 25 mm (1") diameter, use Crouse Hinds EC couplings. Connections are to be long enough so that the conduit will remain intact if the equipment moves 300 mm (12") laterally from its installed position, and flexible enough to transmit less vibration to the structure than is transmitted through the vibration isolation. Coordinate these requirements with the mechanical trades involved. If electrical power connections are not made in a similar manner as part of the electrical Work, report this fact to the Consultant.

.9 Manufacturer’s Inspection & Certification: Refer to the section entitled Mechanical Work General Instructions.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This section specifies thermal insulation requirements that are common to mechanical Work sections of the Specification. It is a supplement to each section and is to be read accordingly.

1.3 REFERENCES

.1 Definitions:

.1 "concealed" means mechanical services and equipment above suspended ceilings, in non-accessible chases, in accessible pipe spaces, and furred-in spaces

.2 "exposed" means exposed to normal view during normal conditions and operations

.3 "domestic water" means all piping (cold, hot, tempered) extended from the building Municipal supply main

.4 “WHMIS sheets” means Workplace Hazardous Materials Information System sheets

.5 “mineral fibre” means a type of insulation manufactured from molten rock, slag, or glass in accordance with requirements of ASTM C547

.6 “PEX” means cross-linked polyethylene

.7 “insulation system” means insulation material, fasteners, jacket, and any other accessory.

.8 “TIAC” means Thermal Insulation Association of Canada.

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strap for Pressure Vessels and for General Applications

.2 ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

.3 ASTM C534 – Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form

.4 ASTM C547 - Standard Specification for Mineral Fibre Pipe Insulation

.5 ASTM C552 – Standard Specification for Cellular Glass Thermal Insulation

.6 ASTM C553 – Standard Specification for Mineral Fibre Blanket Thermal Insulation

.7 ASTM C612 – Standard Specification for Mineral Fiber Block and Board Thermal Insulation

.8 ASTM C1136 – Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

.9 ASTM C1290 – Standard Specification for Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts

.10 ASTM D1784 – Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

.2 Thermal Insulation Association of Canada (TIAC):

.1 Best Practices Guide

.2 TIAC Quality Standard 1501

.3 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S101 – Fire Endurance Tests of Building Construction and Materials

.2 CAN/ULC-S114 – Test for Non-Combustibility

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data Sheets & WHMIS Sheets:

.1 Submit a product data sheet and a WHMIS sheet for each insulation system product. Product data sheets must confirm that the product conforms to requirements of referenced Codes, Standards, and material properties.

1.5 QUALITY ASSURANCE

.1 Mechanical insulation requirements specified in this Section are based on the Thermal Insulation Association of Canada Best Practices Guide.

.2 Qualifications:

.1 Installer's:

.1 The company with the sub-contract for mechanical insulation Work is to be a member in good standing of the Thermal Insulation Association of Canada.

.2 Mechanical insulation is to be applied by journeyman tradespersons in the Heat and Frost Insulation Trade. Registered apprentice tradespersons must be under direct, daily, on-site supervision of a journeyman.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Acceptable insulation product manufacturers are listed in Section 4, Products, of the TIAC Best Practices Guide

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of valve from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Fire Hazard Ratings:

.1 Unless otherwise specified, all insulation system materials inside the building and above ground must have a fire hazard rating of not more than 25 for flame spread and 50 for smoke developed when tested in accordance with CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.2 Thermal Performance:

.1 Unless otherwise specified, thermal performance, i.e. conductivity, of insulation is to meet or exceed the values given in the National Energy Code of Canada for Buildings, and ASHRAE/IES Standard 90.1.

.3 Pipe Insulation Materials:

.1 Horizontal Pipe Insulation at Hangers & Supports: Insulated pipe support inserts consisting of minimum 150 mm (6") long, premoulded, rigid, sectional phenolic foam or fiberglass insulation (of same thickness as adjoining insulation) with a reinforced foil and kraft paper vapour barrier jacket and a 180° captive galvanized steel saddle. Acceptable products are:

.1 Belform Insulation Ltd. "Koolphen K-Block"

.2 Shur-Fit Products Ltd. “Pro-Pipe Supports”

.2 Specialty Insulation for Piping: Factory fabricated foamed glass or closed cell foamed plastic insulation fittings specifically made for pipe mechanical joint fittings and couplings, and pipe risers at riser clamps. Acceptable manufacturers are:

.1 Shur-Fit Products Ltd.

.2 Armacell Canada Inc.

.3 Owens Corning “FOAMGLASS”

.3 TIAC Standard 1501, Code A2, Preformed Mineral Fibre: Rigid, sectional, sleeve type insulation to ASTM Standard C 547, Standard Specification for Mineral Fibre Pipe Insulation, supplied in 915 mm (3’) lengths with a factory applied vapour barrier jacket and adhesive jacket closure.to ASTM C1136, Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation, with a minimum thermal conductivity of 0.033 W @ 24° C.

.4 TIAC Standard 1503, Code A1D, Semi-Rigid Mineral Fibre – High Temperature: Roll form insulation to ASTM Standard C553, Standard Specification for Mineral Fibre Blanket Thermal Insulation, (Type VII), with a factory applied vapour barrier facing. to ASTM C1136, Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation, and a minimum thermal conductivity of 0.042 W @ 24° C.

.4 Insulation Fastenings:

.1 Wire: Minimum #15 gauge galvanized annealed wire.

.2 Aluminium Banding: Equal to Childers Products Co. "FABSTRAPS" minimum 12 mm (½") wide, 0.6 mm (1/16") thick aluminium strapping.

.3 Stainless Steel Banding: Equal to Childers Products Co. "FABSTAPS" 0.6 mm (1/16") thick, minimum 12 mm (½") wide type 304 stainless steel strapping.

.4 Tape Sealant: Equal to MACtac Canada Ltd. self-adhesive insulation tapes, types PAF, FSK, ASJ, or SWV as required to match the surface being sealed.

.5 Adhesive - Mineral Fibre Insulation: Clear, pressure sensitive, brush consistency adhesive, suitable for a temperature range of -20°C to 82°C (-4°F to 180°F), compatible with the type of material to be secured, and WHMIS classified as non-hazardous.

.6 Adhesive – Flexible Elastomeric Insulation: Armacell "Armaflex" #520 air-drying contact adhesive.

.7 Adhesive – Closed Cell Foamed Glass Insulation: Equal to Pittsburgh Corning PC88 multi-purpose two-component adhesive.

.8 Lagging Adhesive: White, brush consistency, ULC listed and labelled, 25/50 fire/smoke rated lagging adhesive for canvas jacket fabric, suitable for colour tinting, complete with fungicide and washable when dry.

.9 Sheet Metal Screws: No. 10 stainless steel sheet metal screws.

.5 Insulation Jackets and Finishes:

.1 TIAC Code C11, Canvas: ULC listed and labelled, 25/50 rated, roll form, minimum 170 g (6 oz.) canvas jacket material.

.2 TIAC Code C2, Rigid Aluminium: Equal to Childers Metals "Lock-on" 0.406 mm (5/32") thick embossed aluminum jacket material to ASTM B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate, factory cut to size and complete with moisture barrier and continuous modified Pittsburgh Z-Lock, and "Fabstraps" and butt straps to cover end to end joints. Fittings are to be 2-piece epoxy coated pressed aluminum with weather locking edges.

.3 TICA Code C3, Stainless Steel: Equal to Childers Metals "Lock-on" 0.254 mm (3/32") thick type 304 embossed stainless steel to ASTM A240, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strap for Pressure Vessels and for General Applications, factory cut to size and complete with moisture barrier and continuous modified Pittsburgh Z-Lock, and butt straps with "Fabstraps" to cover end to end joints. Fittings are to be 2-piece pressed stainless steel with weather locking edges.

.4 Protective Coating - Flexible Foam Elastomeric Insulation: Equal to Armacell "WB Armaflex" weatherproof, water-based latex enamel finish.

3 EXECUTION

3.1 INSTALLATION

.1 General insulation application requirements:

.1 Unless otherwise specified, do not insulate the following:

.1 Factory insulated equipment and piping.

.2 Heated liquid system pump casings, valves, strainers and similar accessories.

.3 Domestic water and heating system expansion tanks.

.4 Manufactured expansion joints and flexible connections.

.5 Domestic hot and tempered water and heating system piping unions, except for steam and condensate piping.

.2 Do not apply insulation unless leakage tests have been satisfactorily completed.

.3 Ensure that all surfaces to be insulated are clean and dry.

.4 Ensure that the ambient temperature is minimum 13° C (55° F) for at least one day prior to the application of insulation, and for the duration of insulation Work, and that relative humidity is and will be at a level such that mildew will not form on insulation materials.

.5 All insulation materials must be stored on site in a proper and dry storage area. Any wet insulation material is to be removed from the site and replaced.

.6 Install insulation directly over pipes and ducts and not over hangers and supports.

.7 Install piping insulation and jacket continuous through pipe openings and sleeves.

.8 When insulating "cold" piping and equipment, extend insulation up valve bodies and other such projections as far as possible, and protect the insulation jacketing from the action of condensation at its junction with the metal.

.9 When insulating vertical piping risers 75 mm (3”) diameter and larger, use insulation support rings welded directly above the lowest pipe fitting, and thereafter at 4.5 m (15’) centres and at each valve and flange. Insulate as per Thermal Insulation Association of Canada National Insulation Standards, Figure No. 9.

.10 Where mineral fibre rigid sleeve type insulation is terminated at valves, equipment, unions, etc., neatly cover the exposed end of the insulation with a purpose made PVC cover on "cold" piping, and with canvas jacket material on "hot" piping.

.11 Where there is interference between weld bead, mechanical joints, etc., and insulation, use purpose made insulation fittings or otherwise neatly and properly insulate these items to maintain the insulation value of the Work. Seal all exposed surfaces of insulation.

.12 Where thermometers, gauges, and similar instruments occur in insulated piping, and where access to heat transfer piping balancing valve ports and similar items are required, create a neat, properly sized hole in the insulation and provide a suitable grommet in the opening.

.13 Where existing insulation Work is damaged as a result of a new mechanical Work, repair the damaged insulation Work to new Work standards.

.2 Insulation For Pipe Mechanical Joint Fittings & Couplings, Etc.:

.1 Provide manufactured insulation fittings, the same thickness as the adjoining pipe insulation, for mechanical joint fittings and couplings, and for piping at riser clamps through the floor. Cover with purpose made PVC covers with joints sealed with tape.

.3 Insulation For Horizontal Pipe At Hangers And Supports:

.1 At each hanger and support location for piping 50 mm (2") diameter and larger and scheduled to be insulated, except where roller hangers and/or supports are required, and unless otherwise specified, supply a factory fabricated section of phenolic foam pipe insulation with integral vapour barrier jacket and captive galvanized steel shield. Supply the insulation sections to the piping installers for installation as the pipe is erected.

.2 .

.4 Pipe Insulation Requirements – Inside Building & Above Ground:

.1 Insulate pipe inside the building and above ground, as scheduled below, in accordance with TIAC Quality Standard 1501, Piping, as follows:

.1 Material: Type A3 mineral fibre.

.2 Insulation application:

.1 1501-H for hot piping.

.2 1501-C for cold piping.

.3 Insulation finish: CPF/1 canvas jacket or CPF/4 PVC jacket for exposed piping.

PIPE SERVICE	**DIAMETER**	**INSULATION THICKNESS**
Domestic Cold Water	to 100 mm	25 mm
	larger than 100 mm	40 mm

PIPE SERVICE	DIAMETER	INSULATION THICKNESS
Domestic Hot Water, Supply & Recirculation	to 40 mm	25 mm
	larger than 40 mm	50 mm
Heating Water Supply & Return (Including Heat Reclaim)	to 40 mm	40 mm
	larger than 40 mm	50 mm
Heating Glycol Solution Supply & Return (Including Heat Reclaim)	to 40 mm	40 mm
	larger than 40 mm	50 mm

Notes:

#1 TIAC Standard 1501 Code A6 foamed elastomeric insulation may be used in lieu of Type A2, with 1501-CA application and specified finish.

#2 Use TIAC non-combustible rock slag mineral fibre insulation for insulated pipe penetrating through fire rated construction, and for high temperature piping insulation such a high pressure steam and condensate

.5 Pipe Insulation Requirements – Outside Building & Above Ground:

.1 Insulate pipe outside the building and above ground, as scheduled below, in accordance with TIAC Quality Standard 1501, Piping, as follows:

.1 Material: Type A2 mineral fibre.

.2 Insulation application:

.1 1501-H for hot piping.

.2 1501-C for cold piping.

.3 Insulation finish: CPF/3.

PIPE SERVICE	DIAMETER	INSULATION THICKNESS
Domestic Cold Water	to 25 mm	50 mm
	larger than 25 mm	65 mm
Heating Water, Supply & Return	to 25 mm	50 mm
	larger than 25 mm	65 mm
Heating Glycol Solution, Supply & Return	to 25 mm	50 mm

PIPE SERVICE	DIAMETER	INSULATION THICKNESS
	larger than 25 mm	65 mm

Notes:

(a) #1 TIAC Standard 1501, Type A5 insulation with 1501-CA application may be used in lieu of mineral fibre insulation.

.6 Pipe Insulation Requirements – Underground Inside & Outside Building:

.1 Insulate pipe underground inside and outside the building, as scheduled below, in accordance with TIAC Quality Standard 1501, Piping, as follows:

.1 Material: Type A7 closed cell cellular glass.

.2 Insulation application: 1501-U.

.3 Insulation finish: weather-proof coating as per insulation manufacturer's instructions.

PIPE SERVICE	DIAMETER	INSULATION THICKNESS
Heating Water, Supply & Return	all	50 mm
Heating Glycol Solution, Supply & Return	all	50 mm

.7 Equipment Insulation Requirements – Inside Building:

.1 Insulate equipment inside the building the building, as scheduled below, in accordance with TIAC Quality Standard 1503, Equipment, as follows:

.1 Material: Type A1D semi-rigid mineral fibre.

.2 Insulation application:

.1 1503-H for hot tanks and equipment.

.2 1503-C for cold tanks and equipment.

.3 Insulation finish:

.1 CEF/2 for hot tanks and equipment.

.2 CEF/1 for cold tanks and equipment.

EQUIPMENT	INSULATION THICKNESS
Chilled Or Domestic Cold Water Pump Casings	40 mm
Non-Insulated Domestic Hot Water Storage Tanks	50 mm
Shell & Tube Heat Exchangers	50 mm
Hydronic Piping Air Separators	40 mm

.8 Equipment Insulation Requirements – Removable/Reusable Type:

.1 Provide custom designed and manufactured removable and reusable insulation covers for the following:

.1 Plate type heat exchanger(s).

.2 Provide "wrap type" removable and reusable insulation covers for "cold" circuit balancing valves, backflow preventers, and similar items, and for steam traps and similar items requiring service in piping less than 150 mm (6") diameter.

.9 Application Of Insulating And Protective Coatings:

.1 Apply insulating and protective coatings in accordance with the manufacturer’s instructions. Remove any splatter from adjacent surfaces. Apply insulating/protective coating to the following surfaces:

.1 Paint all bare metal surfaces clear of "cold" piping and/or equipment insulation for a distance of from 300 mm (12") to 600 mm (24") clear of the pipe or equipment insulation, with "No Sweat-FX" anti-condensation coating.

.2 Paint all bare metal surfaces associated with mechanical systems with an operating temperature 60°C (140°F) with "ThermaLite" insulating coating.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This section specifies requirements, criteria, methods and execution for mechanical demolition Work that are common to one or more mechanical Work sections, and it is intended as a supplement to each section and is to be read accordingly.

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CAN/CSA-S350 – Code of Practice for Safety in Demolition of Structures.

2 PRODUCTS

2.1 MATERIALS

Not Applicable

3 EXECUTION

3.1 REMOVALS

.1 Disconnection and Removal of Existing Mechanical Work:

.1 Where indicated on the drawings, disconnect and remove existing mechanical Work, including hangers, supports, insulation, and similar items. Disconnect at the point of supply, remove obsolete connecting services and make the system safe.

.2 Cut back obsolete piping behind finishes, identify, and cap water-tight unless otherwise specified.

.3 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).

.4 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.

.5 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.

.6 If existing isolation valves are not available to isolate sections of piping to be removed, provide such valves as required. Determine this requirement at the site during the bidding period.

.7 Where existing valves are removed, remove the valve tags, revise existing valve tag charts, and hand the obsolete tags to the Owner.

.8 If any re-design is required due to discrepancies between the mechanical drawings and site conditions, notify the Consultant who will issue a Site Instruction. If, in the opinion of the Consultant, discrepancies between the mechanical drawings and actual site conditions are of a minor nature, the required modifications are to be done at no additional cost.

.9 Where existing mechanical 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.

.10 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.

.2 Roofing Work:

.1 Where roof revisions and/or replacements are part of the project, include for disconnecting, lifting, or temporarily removing mechanical equipment on the roof as required to permit completion of the roofing Work, and for re-installing the equipment when the roofing Work is complete.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This section specifies mechanical system testing, adjusting, and balancing requirements that are common to mechanical Work sections of the Specification and it is a supplement to each applicable section and is to be read accordingly.

1.3 REFERENCES

.1 Definitions:

.1 The following are definitions of words used in this section:

.1 “TAB” – means testing, adjusting and balancing to determine and confirm quantitative performance of equipment and systems and to regulate the specified fluid flow rate and air patterns at the terminal equipment, e.g., reduce fan speed, throttling, etc.

.2 “hydronic systems” – includes heating water, chilled water, glycol-water solution, condenser water, and any similar system

.3 “flow rate tolerance” – means the allowable percentage variation, minus to plus, of actual flow rate values in the Contract Documents

.4 “report forms” – means test data sheets arranged for collecting test data in logical order for submission and review, and these forms, when reviewed and accepted, should also form the permanent record to be used as the basis for required future testing, adjusting and balancing

.5 “terminal” – means the point where the controlled fluid enters or leaves the distribution system, and these are supply inlets on water terminals, supply outlets on air terminals, return outlets on water terminals, and exhaust or return inlets on air terminals such as registers, grilles, diffusers, louvers, and hoods

.6 “main” – means the duct or pipe containing the system’s major or entire fluid flow

.7 “sub-main” – means the duct or pipe containing part of the systems’ capacity and serving two or more branch mains

.8 “branch main” – means duct or pipe servicing two or more terminals

.9 “branch” – means duct or pipe serving a single terminal

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.

.1 Standards: Testing, adjusting and balancing of the complete mechanical systems is to be performed over the entire operating range of each system in accordance with 1 of the following publications:

.1 National Standards For A Total System Balance published by the Associated Air Balance Council

.2 Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems published by the National Environmental Balancing Bureau

.3 Chapter 37, Testing, Adjusting, and Balancing of ASHRAE Handbook HVAC Applications

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Name and Qualifications of Testing and Balancing Agency: Within 30 days of Work commencing at the site, submit the name and qualifications of the proposed testing and balancing agency in accordance with requirements of the article below entitled Quality Assurance.

.3 Sample Test Forms: Submit sample test forms, if other than those standard forms prepared by the Canadian Associated Air Balance Council (CAABC) or National Environmental Balancing Bureau (NEBB) are proposed for use.

.4 Drawing Evaluation Report: Submit a report by the agency to indicate the agency's evaluation of the mechanical drawings with respect to service routing and location or lack of balancing devices. Include the set of drawings used and marked-up by the agency to prepare the report.

.5 Site Visit Reports: Submit a report by the agency after each site visit made by the agency during the construction phase of this Project.

.6 Draft and Final Reports: Submit a draft report and a final report as specified in Part 3 of this Section.

1.5 CLOSEOUT SUBMITTALS

.1 Submittals under this section shall be in conformance with section 01 77 00.

.2 Warranty: Submit a testing and balancing warranty as specified in Part 3 of this Section.

.3 Post Construction Site Visit Reports: Submit reports listing observations and results of post construction site visits as specified in Part 3 of this Section.

1.6 QUALITY ASSURANCE

.1 Testing Agencies:

.1 Testing and balancing agency: Employ the services of an independent testing, adjusting, and balancing agency meeting the qualifications specified below, to be the single source of responsibility to test, adjust, and balance the building mechanical systems to produce the design objectives.

.2 The testing, adjusting and balancing agency is to have successfully completed testing, adjusting and balancing of mechanical systems for a minimum of five projects similar to this Project within the past 3 years, and is to be certified as an independent agency in all required categories by 1 of the following:

.1 CAABC - Canadian Associated Air Balance Council

.2 NEBB - National Environmental Balancing Bureau

2 PRODUCTS

Not applicable.

3 EXECUTION

3.1 SCOPE OF WORK

.1 Perform total mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications and comfort conditions, and recording and reporting the results.

.2 Mechanical systems to be tested, adjusted and balanced include:

.1 Domestic Water Systems: TAB of domestic water systems (all piping extended from the Municipal main) is to include:

.1 Domestic hot water piping.

.2 Heating Systems: TAB of heating systems is to include all piping and equipment fluid temperatures, flows and control, and if TAB is not done during the heating season, a follow-up site visit during the heating season will be required to confirm proper flows and temperatures, and any required system "fine tuning".

3.2 TESTING, ADJUSTING AND BALANCING

.1 General Requirements: Conform to the following requirements:

.1 As soon as possible after award of Contract, the agency is to carefully examine a white print set of mechanical drawings with respect to routing of services and location of balancing devices, and is to issue a report listing the results of the evaluation.

.2 The set of drawings examined by the agency is to be returned with the evaluation report, with red line mark-ups to indicate locations for duct system test plugs, and required revision Work such as relocation of balancing devices and locations for additional devices.

.3 After review of the mechanical Work drawings and specification, the agency is to visit the site at frequent, regular intervals during construction of the mechanical systems, to observe routing of services, locations of testing and balancing devices, workmanship, and anything else that will affect testing, adjusting and balancing.

.4 After each site visit, the agency is to report results of the site visit indicating the date and time of the visit, and detailed recommendations for any corrective Work required to ensure proper adjusting and balancing.

.5 Testing, adjusting and balancing is not to begin until:

.1 Building construction Work is substantially complete and doors have been installed.

.2 Mechanical systems are complete in all respects, and have been checked, started, and adjusted.

.6 All mechanical systems to be tested, adjusted and balanced are to be maintained in full, normal operation during each day of testing, adjusting and balancing.

.7 Obtain copies of reviewed shop drawings of all applicable mechanical plant equipment and terminals, and temperature control diagrams and sequences.

.8 The agency is to walk each system from the system "head end" equipment to terminal units to determine variations of installation from design, and the system installation trades will accompany the agency.

.9 The agency is to check all valves and dampers for correct and locked position, and temperature control systems for completeness of installation before starting equipment.

.10 Wherever possible, the agency is to lock all balancing devices in place at the proper setting, and permanently mark settings on all devices.

.11 For belt-driven equipment, the agency is to report to the Commissioning Agent who in turn is to inform the Contractor and Consultant of any situation where sheaves have to be replaced to suit testing and balancing, and replacements are to be done by the Contractor at no cost.

.12 Noise: the agency is to balance all systems with due regard to objectionable noise which is to be a factor when adjusting fan speeds and performing terminal Work such as adjusting air quantities, and should objectionable noise occur at the design conditions, the agency is to immediately report the problem and submit data, including sound readings, to permit an accurate assessment of the noise problem to be made.

.13 Stratification: the agency is to check all supply air handling system mixing plenums for stratification, and where the variation of mixed air temperature across coils is found to be in excess of ±5% of design requirements, the agency is to report the problem and issue a detail sketch of plenum baffle(s) required to eliminate the stratification.

.14 Tolerances: the agency is to perform testing, adjusting and balancing to within ± 5% of design values, and make and record measurements which are within ± 2% of actual values.

.15 Filters for all air handling systems equipped with air filters, test and balance the systems with simulated 50% loaded (dirty) filters by providing a false pressure drop.

.16 Seasonal requirements: test, adjust and balance air conditioning systems during the summer season and heating systems during winter season, including at least a period of operation at outside conditions within 2.8° C (5° F) wet bulb temperature of maximum summer design condition, and within 5.5° C (10° C) dry bulb temperature of minimum winter design condition, and take final temperature readings during seasonal operation.

.2 Preparation of Reports: Prepare reports as indicated below:

.1 Draft Reports: Upon completion of testing, adjusting, and balancing procedures, prepare draft reports on CAABC or NEBB forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports in the same manner specified for the final reports. Submit 2 complete sets of draft reports. Only 1 complete set of draft reports will be returned.

.2 Final Report: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 2 complete sets of final reports. Use units of measurement (SI or Imperial) as used on the Project Documents.

.3 Report Format: Report forms are to be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, 3-ring binders. Provide binding edge labels with the project identification and a title descriptive of the contents. Divide the contents of the binder into the divisions listed below, separated by divider tabs:

.1 General Information and Summary

.2 Plumbing Systems

.3 Air Systems

.4 Hydronic Systems

.4 Report Contents: The agency is to provide the following minimum information, forms and data:

.1 Inside cover sheet to identify the agency, the Contractor, and Project, including addresses, e-mail addresses and contact names and telephone numbers and a listing of the instrumentation used for the procedures along with the proof of calibration.

.2 The remainder of the report is to contain the appropriate forms containing as a minimum, the information indicated on the standard CAABC or NEBB report forms prepared for each respective item and system.

.3 The agency is to include for each system to be tested, adjusted and balanced, a neatly drawn, identified (system designation, plant equipment location, and area served) schematic "as-built" diagram indicating and identifying all equipment, terminals, and accessories.

.4 The agency is to include report sheets indicating building comfort test readings for all rooms.

.3 Verification of Reports: After the final testing and balancing report has been submitted, the agency is to visit the site with the Contractor and Consultant to spot check results indicated on the balancing report. The agency is to supply all labour, ladders, and instruments to complete spot checks. Note that if results of spot checks do not, on a consistent basis, agree with the final report, the spot check procedures will stop and the agency is to then rebalance the systems involved, resubmit the final report, and again perform spot checks with the Contractor and Consultant.

.4 Certification and Warranty: When the final report has been accepted, the Contractor is to submit to the Owner, in the name of the Owner, a certificate equal to the CAABC National Guaranty Certification or a NEBB Quality Assurance Program Bond, and in addition, the Contractor is to submit a written extended warranty from the agency covering 1 full heating season and 1 full cooling season, during which time any balancing problems which occur, with the exception of minor revision Work done during scheduled site visits, will, at no cost, be investigated by the agency and reported on to the Owner, and if it is determined that the problems are a result of improper testing, adjusting and balancing, they are to be immediately corrected without additional cost to the Owner.

.5 Post Balancing Site Visits: After acceptance of the final report, the agency is to perform post testing and balancing site visits in accordance with the following requirements:

.1 Post-testing and balancing site visits are to be made:

.1 Once during the 1st month of building operation.

.2 Once during the 3rd month of building operation.

.3 Once between the 4th and 10th months in a season opposite to the 1st and 3rd month visit.

.2 During each return visit and accompanied by the Owner's representative, the agency is to spot rebalance terminal units as required to suit building occupants and eliminate complaints.

.3 The agency is to schedule each visit with the Contractor and the Owner, and inform the Consultant.

.4 After each follow-up site visit, the agency is to issue to the Contractor and Consultant a report indicating any corrective Work performed during the visit, all abnormal conditions and complaints encountered, and recommended corrective action.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide domestic water piping and valves.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 11 13 – Domestic Cold Water Booster Pump Set

.2 Section 22 11 19 – Domestic Water Piping Specialties

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 National Sanitation Foundation (NSF):

.1 NSF/ANSI/CAN 61 – Drinking Water System Components-Health Effects

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers listed throughout Part 2 are acceptable subject to conformance with the requirements of the drawings, schedules and Specification.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of valve from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 All products specified in this section that are in contact with domestic water are to be NSF/ANSI/CAN 61 certified.

.2 Pipe, Fittings and Joints:

.1 Hard Copper - Solder Joint: Type "L" hard drawn seamless copper to ASTM B88, complete with wrought copper solder type fittings to ASME/ANSI B16.22 and soldered joints using NSF/ANSI 61 certified silver alloy lead-free solder for cold water pipe, and 95% tin/5% Antimony or silver alloy lead free solder for other services, with flux to ASTM B813.

.2 Copper Pressure Coupled Joint: Type "L" hard drawn seamless copper to ASTM B88 with Viega "ProPress" copper fittings with "Smart Connect" feature, EDPM seals, and pressure type crimped joints made by use of a Rigid Tool Co. Model 330-B or Model 330-C electro-hydraulic crimping tool.

.3 Dielectric Unions:

.1 Lead-free dielectric unions, each complete with a thermoplastic liner and rated minimum 1725 kPa (250 psi) at 120º C (250º F).

.4 Shut-Off Valves:

.1 Brass & Bronze Ball Valves: Lead free, Class 600, 4140 kPa (600 psi) non-shock WOG rated, 2-piece, full port ball type valves, each complete with a forged brass or bronze body, blowout-proof stem, solid forged brass or bronze chrome plated ball, "Teflon" or "PTFE" seat, a removable coated steel lever handle marked with valve identification, and ends to suit the piping being connected. Valves in insulated piping are to be complete with stem extensions. Acceptable manufacturers are:

.1 Toyo Valve Co.

.2 Milwaukee Valve Co.

.3 Kitz Corporation

.4 Combraco Industries Inc. Apollo

.5 Watts Water Technologies Inc.

.5 Check Valves:

.1 Horizontal: Class 125, bronze, lead-free with identifying tag, 1380 kPa (200 psi) WOG rated horizontal swing type check valves with ends to suit the connecting piping. Acceptable products are:

.1 Toyo Valve Co.

.2 Milwaukee Valve Co.

.3 Kitz Corporation

.4 Combraco Industries Inc. Apollo

.5 Watt Water Technologies Inc.

.2 Vertical: Equal to Kitz Corp. Code 26, bronze, lead-free, 1725 kPa (250 psi) WOG rated vertical lift check valve with ends to suit the connecting piping.

.6 Balancing Valves:

.1 Solder or flanged end type as required, globe style, non-ferrous circuit balancing valves designed to facilitate precise flow measurement, precision flow balancing, and positive shut-off, complete with capped and valved drain connection, and valved ports for connection to a differential pressure meter. Acceptable products are:

.1 S.A. Armstrong Model CBV Series

.2 Tour and Andersson Model ST Series

.3 Watts Industries (Canada) Inc. Model CSM Series

.4 ThermOmega Tech Inc. “CircuitSolver CSUA

.7 Drain Valves:

.1 Refer to Part 2 of the mechanical Work section entitled Basic Mechanical Materials and Methods

.8 Pressure Reducing Valves:

.1 For piping to and including 50 mm (2") diameter, lead free, non-corrosive, non-ferrous direct spring acting pressure reducing valves to CAN/CSA B356, Water Pressure Reducing Valves for Domestic Water Supply Systems, each:

.1 Factory set at 345 kpa (50 psi) unless otherwise specified or required

.2 Field adjustable from 175 kpa (25 psi) to 520 kpa (75 psi)

.3 Complete with an integral inlet strainer.

.2 Acceptable products are:

.1 Conbraco 36C Series

.2 Zurn/Wilkins 600XL Series

.3 Watts Industries (Canada) Inc. #LF25AUB Series

.4 Cash-Acme EB-25 Series

.5 Caleffi Hydronic Solutions

.3 For piping 65 mm (2½") diameter and larger, non-corrosive pilot operated pressure reducing valve to CAN/CSA B356, Water Pressure Reducing Valves for Domestic Water Supply Systems, each:

.1 factory set at the required pressure

.2 field adjustable

.3 complete with screwed or flanged connections

.4 complete with a brass body pilot valve with stainless steel seat

.5 Acceptable products are:

.1 Singer Valve Model 106-PR

.2 Zurn/Wilkins Model ZW109

.3 Watts Industries (Canada) Inc. Series N223

3 EXECUTION

3.1 PREPARATION

.1 Demolition / Removal:

.1 Do all required domestic water system demolition Work. Refer to demolition requirements specified in the mechanical Work section entitled Demolition and Revision Work.

3.2 INSTALLATION

.1 Piping Installation Requirements:

.1 Provide all required domestic water piping.

.2 Piping, unless otherwise specified, is to be as follows:

.1 for pipe inside building and above ground - Type "L" hard copper with solder joints or, **at your option**, Type "L" hard copper with pressure coupled mechanical joints, or Type 304/304L stainless steel with screwed joints or grooved end coupling joints

.3 Slope all piping so that it can be completely drained.

.4 Provide proper dielectric unions in all connections between copper pipe and ferrous pipe or equipment.

.5 Secure trap seal primer tubing embedded in concrete to reinforcing steel in a secure manner and be present during the concrete pour to ensure that the tubing is not damaged or dislodged.

.2 Installation of Shut-Off and Check Valves:

.1 Refer to Part 3 of the mechanical Work section entitled Basic Mechanical Materials and Methods.

.2 Valves to and including 100 mm (4”) diameter are to be ball type. Valves larger than 100 mm (4”) diameter are to be butterfly type.

.3 Valves in CPVC rigid piping are to be Ipex “Aquarise” CPVC ball valves.

.3 Installation of Balancing Valves:

.1 Provide balancing valves in domestic hot water recirculation piping where shown or required.

.2 Locate each valve such that it is easily accessible.

.4 Installation of Drain Valves:

.1 Refer to Part 3 of the mechanical Work section entitled Basic Mechanical Materials and Methods.

.5 Installation of Partition Stops:

.1 Provide partition stops in domestic water piping to each group of suite washroom plumbing fixtures. Locate partition stops in piping near the floor level in inconspicuous but accessible locations. Confirm exact locations prior to roughing-in.

.6 Installation of Pressure Reducing Valves:

.1 Provide domestic water pressure reducing valves in piping where shown and/or specified. Install so that each valve is readily accessible. Whenever possible, provide pressure reducing valves factory pre-set to required pressures.

.2 Check and test operation and adjust as required.

.7 Piping Expansion and Contraction Facilities:

.1 Provide piping expansion loops or expansion compensators with guides and anchors where indicated for piping expansion and contraction facilities. Refer to requirements in the mechanical Work Section entitled Piping Expansion Compensation.

.2 Confirm exact locations prior to installation.

3.3 SYSTEM STARTUP

.1 Flushing and Disinfecting Piping:

.1 Flush and disinfect all new and/or reworked domestic water piping after leakage testing is complete.

.2 Isolate new piping from existing piping prior to flushing and disinfecting procedures.

.3 Flush piping until all foreign materials have been removed and the flushed water is clear. Provide connections and pumps as required. Open and close valves, faucets, hose outlets, and service connections to ensure thorough flushing.

.4 When flushing is complete, disinfect the piping with a solution of chlorine in accordance with requirements of the Ministry of Environment document entitled Procedure for Disinfection of Drinking Water in Ontario, all under supervision of a P. Eng. authorized by the Professional Engineers of Ontario to perform such Work.

.5 When disinfecting is complete, submit water samples to a certified laboratory for purity testing and, when testing indicates pure water in accordance with governing standards, submit a copy of the test results and fill the systems.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide drainage waste and vent piping and valves.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 13 18 – Drainage and Vent Piping Specialties

.2 Section 22 13 19 – Drainage Pumps and Accessories

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

.2 ASTM B306 - Standard Specification for Copper Drainage Tube (DWV)

.2 Canadian Standards Association (CSA):

.1 CAN/CSA-B70 -

.2 CAN/CSA B182.2 - PVC Sewer Pipe and Fittings (PSM Type)

.3 CAN/CSA-B602 -

.3 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S102.2 – Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.

.2 CAN/ULC-S115 - Standard Method Of Fire Tests Of Firestop Systems

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers listed throughout Part 2 are acceptable subject to conformance with the requirements of the drawings, schedules and Specification.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of valve from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Pipe, Fittings and Joints:

.1 Above Ground PVC - DWV: Rigid IPS PVC drain, waste and vent pipe and fittings to CAN/CSA B181.2, complete with a flame spread rating less than 25 and a smoke developed rating less than 50 when tested to CAN/ULC-S102-2, solvent weld joints, and, for fire barrier penetration, approved firestop conforming to CAN4-S115.

.2 Copper- Solder Joint: Type DWV hard temper to ASTM B306, with forged copper solder type drainage fittings and 50% lead - 50% tin solder joints.

.3 Cast Iron: Class 4000 cast iron pipe and fittings to CAN/CSA-B70, cast iron soil pipe, fittings, and means of joining, and mechanical coupling joints to CAN/CSA-B602, Mechanical couplings for drain, waste, and vent pipe and sewer pipe, equal to Anaco “Husky” Series 400, 4-strap type for pipe to 100 mm (4”) and 6-strap type for piping larger than 100 mm (4”).

.4 Galvanized Steel - Victaulic Coupling Joint: Schedule 40 mild steel, galvanized, ASTM A53, factory or site rolled grooved, complete with Victaulic galvanized ductile iron grooved end fittings and, unless otherwise specified, Victaulic Style 77 hot dip galvanized mechanical joint couplings with Grade M gaskets.

3 EXECUTION

3.1 PREPARATION

.1 Demolition / Removal:

.1 Do all required drainage and vent piping demolition Work. Refer to demolition requirements specified in the mechanical Work Section entitled Demolition and Revision Work.

3.2 INSTALLATION

.1 Drain and Vent Piping Installation Requirements:

.1 Provide all required drainage and vent piping. Pipe, unless otherwise specified, is to be as follows:

.1 for pipe inside the building and above ground in sizes to and including 65 mm (2½") diameter - type DWV copper

.2 for pipe inside the building and above ground in sizes 75 mm (3") diameter and larger - Class 4000 cast iron with 4-strap couplings for pipe to and including 100 mm (4”) diameter, and 6-strap couplings for piping larger than 100 mm (4”) diameter, all with torque wrench tightened bolts, and, where pipe riser/building expansion will or may be a problem, cast iron pipe expansion joints equal to Bibby-Ste-Croix 654 Series

.3 for pipe inside the building and above ground in lieu of type DWV copper and cast iron, at your option and where permitted by governing Codes and Regulations – 25/50 rated rigid IPS PVC drain, waste and vent pipe

.2 Unless otherwise specified, slope horizontal drainage piping above ground in sizes to and including 75 mm (3") diameter 25 mm (1") in 1.2 m (4'), and pipe 100 mm (4") diameter and larger 25 mm (1") in 2.4 m (8').

.3 Install and slope underground drainage piping to inverts or slopes indicated on the drawings to facilitate straight and true gradients between the points shown. Verify available slopes before installing the pipes.

.4 Unless otherwise specified, slope horizontal branches of vent piping down to the fixture or pipe to which they connect with a minimum pitch of 25 mm (1") in 1.2 m (4').

.5 Extend vent stacks up through the roof generally where shown but with exact locations to suit site conditions and in any case a minimum of 3 m (10') from fresh air intakes. Terminate vent stacks a minimum of 330 mm (13") above the roof (including roof parapets) in vent stack covers.

.6 Provide proper dielectric unions at connections between copper pipe and ferrous pipe or equipment.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide domestic hot water heat exchangers.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 11 16 – Domestic Water Piping and Valves

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA-B51, Performance of Electric Storage Tank Water Heaters for Domestic Hot Water Service

.2 American National Standards Institute (ANSI):

.1 ANSI Z21.22/CSA 4.4, Relief Valves for Hot Water Supply Systems

.3 National Sanitation Foundation (NSF):

.1 NSF/ANSI/CAN 61, Drinking Water System Components-Health Effects

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

.3 Anchor Fabrication Drawing: Submit anchor shop drawing(s) to detail the fabrication and installation of water piping anchors. The drawing(s) must be prepared and stamped by a Professional Structural Engineer registered and licensed in the jurisdiction of the Work.

.4 Anchor Installation Certification: As specified in Part 3 of this Section, submit a letter from the anchor design engineer stating that the anchor installation has been examined at the site and the anchors are properly fabricated and installed.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable manufacturers using S. A. Armstrong Ltd., Taco (Canada) Ltd. or ITT Bell & Gossett heaters are:

.1 Clemmer Industries (1964) Ltd.

.2 DTE Industries (2010) Ltd.

.3 O'Connor Tanks Ltd.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Domestic Hot Water Heater Exchanger:

.1 Storage tank and immersion heat exchanger assembly as per the drawing schedule, constructed and tested in accordance with CSA B51, and Provincial pressure vessel regulations, and complete with:

.1 Heater: a 690 kPa (100 psi) rated, double wall (tube within tube), seamless copper U-tube bundle with a scale factor allowance of 0.0005, boiler water actuated, supported by brass tube supports and expanded into a carbon steel tube sheet which is bolted to a cast iron head equipped with supply, return, and vacuum breaker tappings.

.2 Tank: 1035 kPa (150 psi) rated steel tank of welded fabrication, constructed from ASTM A-285 Gr. C black sheet steel, complete with all required non-ferrous tappings for pipe connections, control components, and instruments, a 275 mm x 375 mm (11" x 15") manhole, structural steel support saddles or legs as applicable, and a heavy exterior shop coat of epoxy enamel applied over primer to cleaned metal.

.3 Tank lining: minimum 15 mm (½") thick 100% covering coat of non-toxic, chemically inert, thermal shock resistant, corrosion resistant and rust preventing hydraulic cement applied to sand blasted clean metal and to all ferrous surfaces so that domestic water does not come in contact with ferrous surface.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Domestic Hot Water Heater Exchanger:

.1 Provide domestic hot water heat exchanger assemblies where shown.

.2 Secure the tank in place, level, and plumb, on a concrete housekeeping pad.

.3 Connect with domestic water piping as per the drawing detail and coordinate connection of heating piping with the heating piping trade.

.4 Set controls to deliver maximum 60° C (140° F) domestic hot water. Confirm domestic hot water supply temperature setting.

.2 Manufacturer's Certification:

.1 Refer to requirements of the article entitled Equipment and System Manufacturer's Certification in the Mechanical Work General Instructions Section. Submit a copy of the letter prior to Substantial Performance.

.3 Equipment and System Start-Up:

.1 Refer to requirements of the article entitled Equipment and System Start-Up in the Mechanical Work General Instructions Section.

.4 Commissioning:

.1 Refer to commissioning requirements specified in the Mechanical Work General Instructions Section.

.5 Demonstration and Training:

.1 Refer to the article entitled Equipment and System O & M Demonstration & Training in the Section entitled Mechanical Work General Instructions. Include for 2 hours of on-site training for 2 groups of 6 people.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide domestic hot water circulating pumps.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 11 16 – Domestic Water Piping and Valves

.2 Section 22 33 15 – Domestic Water Heat Exchangers

.3 Section 22 35 05 – Domestic Hot Water Storage Tanks

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 Pump electrical components are to be CSA or ETL certified.

.2 National Sanitation Foundation (NSF):

.1 NSF/ANSI/CAN 61, Drinking Water Components-Health Effects

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

.3 Anchor Fabrication Drawing: Submit anchor shop drawing(s) to detail the fabrication and installation of water piping anchors. The drawing(s) must be prepared and stamped by a Professional Structural Engineer registered and licensed in the jurisdiction of the Work.

.4 Anchor Installation Certification: As specified in Part 3 of this Section, submit a letter from the anchor design engineer stating that the anchor installation has been examined at the site and the anchors are properly fabricated and installed.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Armstrong Pumps Inc.

.2 ITT Bell & Gossett

.3 Grundfos Canada Inc.

.4 Taco Canada Ltd.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Horizontal In-Line Circulating Pumps:

.1 All bronze or stainless steel construction centrifugal pumps in accordance with the drawing schedule and complete with:

.1 Flanged pipe connections.

.2 A balanced impeller.

.3 A mechanical seal.

.4 An ODP or ECM motor (as scheduled).

.5 A terminal box for conduit connection.

.2 Automatic Pump Control:

.1 Equal to ITT Bell & Gossett AQS Series 115 volt Aquastat to automatically control the pump on and off in response to domestic water temperature and equipped with a stainless steel pipe clip, bimetal sensing element, and insulated #18 AWG 450 mm (18") wire leads.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Circulating Pumps:

.1 Provide horizontal in-line domestic hot water circulating pumps where shown.

.2 Install the pumps in place in vertical piping approximately 1.2 m (4') above the floor in accordance with the pump manufacturer's instructions.

.2 Installation of Pump Control:

.1 Provide an aquastat to control the pump on and off in response to domestic water temperature. Install in accordance with the manufacturer's instructions. Set on and off temperatures in accordance with the Consultant's instructions.

.3 Manufacturer's Certification:

.1 Refer to requirements of the article entitled Equipment and System Manufacturer's Certification in the Mechanical Work General Instructions section. Submit a copy of the letter prior to Substantial Performance.

.4 Equipment and System Start-Up:

.1 Refer to requirements of the article entitled Equipment and System Start-Up in the Mechanical Work General Instructions section.

.5 Commissioning:

.1 Refer to commissioning requirements specified in the Mechanical Work General Instructions section.

.6 Demonstration and Training:

.1 Refer to the article entitled Equipment and System O & M Demonstration & Training in the section entitled Mechanical Work General Instructions. Include for 2 hours of on-site training for 2 groups of 6 people.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide domestic hot water storage tanks.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 11 16 – Domestic Water Piping and Valves

.2 Section 22 33 15 – Domestic Water Heat Exchangers

.3 Section 22 35 00 – Domestic Hot Water Circulating Pumps

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code

.2 National Sanitation Foundation (NSF):

.1 NSF/ANSI/CAN 61, Drinking Water Components-Health Effects

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

.3 Anchor Fabrication Drawing: Submit anchor shop drawing(s) to detail the fabrication and installation of water piping anchors. The drawing(s) must be prepared and stamped by a Professional Structural Engineer registered and licensed in the jurisdiction of the Work.

.4 Anchor Installation Certification: As specified in Part 3 of this section, submit a letter from the anchor design engineer stating that the anchor installation has been examined at the site and the anchors are properly fabricated and installed.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Rheem Canada Ltd.

.2 John Wood (GWS Water Heating Co.)

.3 A.O. Smith Water Products Co.

.4 Bradford White Canada Inc.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Insulated and Jacketed Domestic Hot Water Storage Tanks:

.1 Vertical steel domestic hot water storage tank, 1103 kPa (150 psi) rated, sized in accordance with the drawing schedule, and complete with:

.1 A glass or porcelain interior coating.

.2 Two magnesium anodes rigidly secured in place.

.3 50 mm (2") thick polyurethane or equal foam insulation.

.4 An enamelled steel jacket.

.5 Tank openings for circulating lines, hot water outlet relief valve, temperature control, drain valve, and a thermometer.

.6 An ASME rated temperature/pressure relief valve.

.7 A ball type hose end drain valve.

.8 An aquastat for pump/heater control.

3 EXECUTION

3.1 INSTALLATION

.1 Installation of Domestic Hot Water Storage Tanks:

.1 Provide domestic hot water storage tanks where shown.

.2 Secure each tank in place, level and plumb on a reinforced concrete housekeeping pad.

.3 Connect with piping in accordance with requirements of the drawing detail.

.4 Pipe each relief valve to drain.

.5 Provide a tank aquastat for recirculation pump/heater control and connect complete with wiring in conduit in accordance with requirements of the electrical Work.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide domestic water expansion tanks.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 11 16 – Domestic Water Piping and Valves

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code

.2 National Sanitation Foundation (NSF):

.1 NSF/ANSI/CAN 61, Drinking Water Components-Health Effects

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

.3 Anchor Fabrication Drawing: Submit anchor shop drawing(s) to detail the fabrication and installation of water piping anchors. The drawing(s) must be prepared and stamped by a Professional Structural Engineer registered and licensed in the jurisdiction of the Work.

.4 Anchor Installation Certification: As specified in Part 3 of this section, submit a letter from the anchor design engineer stating that the anchor installation has been examined at the site and the anchors are properly fabricated and installed.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Watts Canada

.2 Amtrol Inc. “THERM-X-TROL”

.3 Xylem Inc. “Bell & Gossett”

.4 Taco Inc.

.5 Calefactio Solutions Inc. “Expandflex”

.6 Wessels Co.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Domestic Water Expansion Tanks:

.1 Lead free, replaceable bladder type steel tank in-line or stand type as indicated, factory pressurized (adjustable) with permanent separation of air and water, suitable for a maximum working pressure of 1035 kPa (150 psi) at 115° C (240° F), complete with a red oxide primer finish and the following:

.1 An NPT stainless steel system connection.

.2 A Schrader air charging valve.

.3 A heavy-duty butyl rubber bladder.

.4 A polypropylene liner.

.5 A tapping for installation of a pressure gauge.

.6 A tapping for a drain valve.

.7 For horizontal tanks only, enamelled steel mounting saddles supplied loose.

.2 Tanks for domestic cold water booster pump sets are to be sized for the minimum run time of the pump set.

3 EXECUTION

3.1 INSTALLATION

.1 Installation of Domestic Water Expansion Tanks:

.1 Provide domestic water expansion tanks where shown.

.2 Secure each horizontal in-line expansion tank in place from the cold water piping with properly sized galvanized steel hangers secured to the structure on each side of the tank, or by means of properly sized galvanized steel hanger rods and support saddles supplied with tank.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide a natural gas piping system

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CAN/CSA-B149.1, Natural Gas and Propane Installation Code, as amended by local Gas Codes

.2 CSA/ANSI Z21.80/CSA 6.22, Line Pressure Regulators

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers are as noted throughout Part 2

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Pipe, Fittings and Joints:

.1 Uncoated Black Steel - Screwed Joints: Schedule 40 mild black carbon steel, ASTM A53, Grade B, complete with malleable cast iron screwed fittings to ANSI B2.1, and screwed joints.

.2 Uncoated Black Steel - Welded Joints: Schedule 40 mild black carbon steel, ASTM A53, Grade B, mill or site bevelled, complete with factory made forged steel butt welding fittings and welded joints.

.3 Copper-Uncoated: Type "G" seamless copper tubing to ASTM B837, hard temper with wrought copper capillary brazed joint type fittings to ASTM B.61, and brazed joints made with "Sil-Fos" or "Sil-Fos 5" brazing alloy, or, soft temper with flared brass fittings of a single 45º flare type, forged or with a machined long nut and copper to copper threaded connectors, and, where required, flared brass copper to NPS adapters.

.4 Flexible Stainless Steel: Flexible, CSA certified, 860 kPa (125 psi) rated, gas-tight, convoluted stainless steel tubing factory jacketed with a bright yellow PVC coating which is continuously identified. The tubing is to be supplied in coils and is to be complete with factory attached stainless steel end fittings, and adapter unions, protective plates, and steel clamps.

.2 Piping Unions:

.1 Screwed Piping: Malleable iron, ground joint, bronze or brass to iron or bronze to bronze seat screwed unions and union elbows with a minimum pressure rating of 1725 kPa (250 psi) steam at 260° C (500° F).

.2 Flanged Piping: Forged carbon steel slip-on type raised faced welding flange unions to ASTM A105, 150 lb. Class for steel pipe, and slip-on type 150 lb. Class bronze flanges for copper pipe.

.3 Copper to Steel: Equal to Kamco Products "Copper Stopper".

.3 Shut-off Valves:

.1 Ball Type: CSA certified, minimum 3100 kPa (450 psi) WOG rated, 1/4 turn, full port non-lubricated brass ball valves, each complete with:

.1 A Teflon PTFE seat.

.2 Chrome plated solid ball.

.3 Removable identified lever handle.

.4 Screwed ends.

.2 Plug or Ball Type: CSA certified, plain face flanged, Class 125, 1380 kPa (200 psi) rated, 1/4 turn, cast iron lubricated plug valves, each wrench operated and complete with cylindrical plug with lubricant grooves, lubricant screw, and lubricant receptacle, or full port carbon steel full port ball valves with flanged ends.

.3 building.

.4 Pressure Regulators:

.1 CSA certified pressure regulators as follows:

.1 Vented type: spring-loaded self-operated design, tight closing, selected for the facility gas pressure and piping pressure loss, and connected equipment load at full firing rate plus 20% spare, and complete with:

.1 1035 kPa (150 psi) rated cast iron body finished with corrosive resistant epoxy enamel.

.2 Aluminum diaphragm and spring case with Nitrile diaphragm, disc, and body o-ring.

.3 Throttling type, high flow rate, tight shut-off relief valve selected to protect equipment downstream of the regulator in coordination with regulator capacity.

3 EXECUTION

3.1 INSTALLATION

.1 Demolition:

.1 Do all required gas system demolition Work. Refer to demolition requirements specified in the mechanical Work section entitled Demolition and Revision Work.

.2 Natural Gas Piping Installation Requirements:

.1 Provide all required natural gas distribution piping and connect gas fired or operated equipment, and provide all required vent piping to atmosphere, including vent piping from pressure regulators. Do all piping Work in accordance with requirements of CAN/CSA-B149.1.

.2 Piping is to be as follows:

.1 For underground piping, coated Schedule 40 black steel, coated soft copper, or PVC.

.2 For above ground piping, uncoated Schedule 40 black steel, hard temper or soft copper, or, if permitted, flexible stainless steel.

.3 Install flexible stainless steel pipe in strict accordance with the pipe manufacturer’s printed instructions.

.4 Slope gas piping in the direction of flow to low points.

.5 Provide full pipe diameter 150 mm (6") long drip pockets at the bottom of all vertical risers, at all piping low points, and wherever else shown and/or required.

.6 Identify all natural gas piping above ground with 2 coats of safety yellow enamel applied over primer, and SMS Ltd. or equal coil type vinyl identification makers with arrows.

.3 Installation of Shut-Off Valves:

.1 Provide CSA approved ball type or lubricated plug type shut-off valves to isolate equipment, and wherever else shown.

.2 Ensure that valves are located for easy accessibility and maintenance.

.4 Installation of Natural Gas Convenience Outlets:

.1 Provide natural gas convenience outlets and wall mount where shown.

.2 Provide a shut-off valve in connecting piping, confirm exact location prior to roughing-in, and ensure that the outlet is rigidly secured in place.

.5 Installation of Pressure Regulators:

.1 Provide pressure regulators in gas distribution piping where indicated and/or required.

.2 Use vented type pressure regulators for all other applications.

.3 Install regulating stations in accordance with requirements of CAN/CSA-B149.1.

.4 Provide 6 mm (¼") diameter test ports upstream and downstream of each regulator assembly.

.5 Locate outdoor regulating stations a minimum of 300 mm (12") away from walkways, and 3 m (10') away from equipment air intakes and building openings. Provide all required vent piping and terminate vents in a turn-down elbow fitting with bronze bug screen secured in place.

.6 Locate indoor regulating stations in locations accessible without the use of ladders or lifts. Combine vents where permitted and increase vent pipe size accordingly. Extend vent piping up through the roof 3 m (10') away from equipment air intakes and building openings and terminated in a turn-down elbow fitting with bronze bug screen secured in place.

.7 When installation is complete, check each regulator for proper operation and adjust and set each regulator to the correct discharge pressure.

.8 Indicate operating set-points, relief settings and vent arrangements for each regulating station on as-built record drawings.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide flue gas vents

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 55 33 – Gas-Fired Unit Heaters

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA B139, Installation Code for Oil Burning Equipment

.2 CSA B 149.1, Natural Gas and Propane Installation Code

.2 Underwriters Laboratories Canada (ULC)

.1 CAN/ULC-S604, Standard for Factory Built Type A Chimney

.2 CAN/ULC-S605, Standard for Gas Vents

.3 CAN/ULC-S609, Standard for Low Temperature Vents Type L and PL

.4 CAN/ULC-S636, Standard for Type BH Gas Venting Systems

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

.3 Shop Drawings:

.1 Submit shop drawings indicating engineered design of venting system.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Selkirk

.2 J.A. Ryder

.3 Red-I-Vent

.4 Van Packer

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Condensing Appliance Type BH Flue Gas Vents (and Combustion Air Intakes):

.1 PVC (for vent gas to 65° C-130° F) or CPVC (for vent gas to 90° C-195° F) solvent weld vent pipe and fittings, in accordance with CAN/CSA B149.1, , certified as type BH vents to ULC Standard-S636, suitable for negative or positive venting and complete with an orange warning label to verify compliance with ULC-S636, and a moulded cap and screen with barrel for vertical termination, or low profile wall termination kit with round face plates, as applicable.

3 EXECUTION

3.1 INSTALLATION

.1 Installation of Type BH Flue Gas Vents (and Combustion Air Intakes) :

.1 Provide type BH flue gas vents and combustion air intakes for condensing appliances as shown.

.2 Support spacing and slope is to be in accordance with the flue gas vent manufacturer’s instructions. Installation is to be in accordance with the gas fired appliance manufacturer’s instructions and the requirements of CAN/CSA B149.1.

.3 Route the piping using the shortest route possible to the termination point while avoiding interference with other Work. Slope horizontal vent piping for positive drainage and provide valved drainage PVC piping terminated over a floor drain where required to prevent condensate build-up. Do not install exterior vents with a length such that freezing of condensate may occur.

.4 Equip the termination of vent with a turn-down elbow with open end covered with bronze insect screen. Terminate exhaust vent a minimum of 3 m (10') away from fresh air intakes and operable windows.

.5 Confirm flue gas vent diameter prior to ordering.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide gas-fired unit heaters

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 11 23 – Natural Gas Piping System

.2 Section 23 51 23 – Flue Gas Vents

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CAN/CSA-B149.1, Natural Gas and Propane Installation Codes

.2 American National Standards Institute (ANSI):

.1 ANSI Z83.8/CSA 2.6, Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, and Gas-Fired Duct Furnaces

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Modine

.2 Lennox Industries (Canada) Ltd.

.3 Thomas & Betts Corp. "Reznor"

.4 Sterling HVAC Products

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Gas-Fired Unit Heaters:

.1 CSA or C-ETL certified horizontal air flow unit heaters in accordance with requirements of ANSI Z83.8/CSA 2.6, each factory assembled, pre-rewired, and test fired, each as per the drawing schedule, and with characteristics as follows:

.1 Noise: not to exceed 75 dBA at 1 m (3').

.2 Efficiency: minimum steady state thermal efficiency of 80% in accordance with ASHRAE 90.1.

.3 Electrical supply: 120 volts, 1 phase, 60 Hz.

.4 Gas supply: between 1.7 and 3.5 kPa (0.25 and 0.50 psi).

.5 Venting: horizontal or vertical.

.2 Cabinet: Internally insulated cabinet constructed of heavy-gauge galvanized steel, finished with baked powder epoxy enamel, and complete with hinged access door, adjustable louvers, a wiring junction box mounted inside or on the exterior of the cabinet, mounting spot nuts for hanger rods secured to the top of the cabinet, or an accessory mounting bracket kit.

.3 Heat Exchanger and Burners: Tubular, curved design stainless steel heat exchanger with an extended fifteen year manufacturer's warranty, secured to a vest panel equipped with flue box and a motorized combustion air inducer to purge the heat exchanger and positively vent combustion products, and aluminized steel inshot burners, each removable from the assembly or all removable as a single component, and complete with a venturi to mix gas and air for proper combustion, and a burner view port.

.4 Fan(s): Direct driven propeller type fan or fans, depending on unit size, with permanently lubricated open drip-proof motor(s) conforming to requirements specified in the mechanical Work Section entitled Basic Mechanical Materials and Methods, and a wire cage guard.

.5 Controls and Safeties: Factory installed and pre-wired and complete with:

.1 A 24 volt redundant combination gas valve with 100% safety shut-off, manual main shut-off valve, pressure regulator, and automatic solenoid valve.

.2 Solid-state, electronic, direct spark ignition and a separate electronic flame sensor to initiate three attempts to re-ignite after loss of flame, then locks out unit operation.

.3 A pressure switch to prove adequate flow through venting.

.4 High temperature limit controls with a fixed temperature setting to protect from abnormal operating temperatures.

.5 A solid-state, integrated, combination ignition and fan control board with fan timer control, diagnostic LED for trouble shooting, and continuous fan operation control.

.6 A 120/24 volt control transformer.

.7 A terminal strip for 24 volt control connections.

3 EXECUTION

3.1 INSTALLATION

.1 Installation of Gas-Fired Unit Heaters:

.1 Provide gas-fired unit heaters where shown.

.2 Secure unit heaters in place at the proper height by means of hanger rods attached to the structure. Ensure that the heaters are level and plumb. Provide any supplemental structural steel necessary for installation where shown. Ensure that the unit discharge is not obstructed.

.3 Provide a thermostat for each heater and mount where shown. Provide all required 24 volt control wiring in conduit in accordance with the electrical Work wiring requirements. Provide a guard for each thermostat.

.4 Equipment and System Manufacturer's Certification: Refer to the article entitled Equipment and System Manufacturer's Certification in the mechanical Work section entitled Mechanical Work General Instructions.

.5 Start-Up: Refer to the article entitled Equipment and System Start-up in the mechanical Work section entitled Mechanical Work General Instructions.

.6 Commissioning: Refer to commission requirements specified in the mechanical Work section entitled Mechanical Work General Instructions.

.7 Demonstration and Training: Refer to the article entitled Equipment and System Operation and Maintenance Demonstration & Training in the mechanical Work section entitled Mechanical Work General Instructions. Include 4 hours of on-site operation demonstration and training for 2 groups of 6 people.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide electric heaters

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA C22.2 No. 46, Electric Air Heaters

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with General Conditions and Section 01 33 00 – Submittals.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 Modine

.2 Ouellet Canada Inc.

.3 Dimplex/Chromalox

.4 Dimplex

.5 Stelpro Heating Inc.

.6 Convectair MNT Inc.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 General RE: Electric Heaters:

.1 Electric heaters are to be complete with automatic reset high limit temperature control, baked epoxy/polyester powder coat white or almond finish as selected, and in accordance with the drawing schedule.

.2 Motorized Unit Heaters:

.1 Horizontal surface mounting unit heaters, each complete with:

.1 Enclosure: die-formed steel with individually adjustable discharge louvers, and mounting brackets for either ceiling or wall swivel mounting.

.2 Heating element: tubular steel heating element with fins.

.3 Fan and motor: resiliently mounted totally enclosed motor in accordance with requirements specified in the mechanical Work section entitled Basic Mechanical Materials and Methods, direct connected to a statically and dynamically balanced aluminium fan and complete with guard.

.4 Integral thermostat: factory installed, tamperproof, adjustable thermostat.

3 EXECUTION

3.1 INSTALLATION

.1 Installation of Room Electric Heaters:

.1 Supply room electric heaters where shown, complete with all required accessories as indicated. Hand heaters, in original packaging, to the electrical trade at the site for installation in the room/area where they are to be installed.

.2 Locate all electric heaters for the electrical trade so that accurate electrical rough-in can be made. Confirm exact locations prior to electrical rough-in.

.3 Ensure that all heaters are properly installed.

.4 Where remote thermostats are indicated, provide the thermostats and all required control wiring (in conduit) and accessories. Unless otherwise indicated, locate thermostats 1.4 m (5') above the floor, and confirm exact thermostat locations prior to roughing-in.

.5 Commissioning: Refer to commissioning requirements specified in the Mechanical Work General Instructions Section.

.6 Demonstration and Training: Refer to the article entitled Equipment and System Operation and Maintenance Demonstration & Training in the Mechanical Work General Instructions Section. Include for a 2 hour on-site heater operation demonstration and training session for 2 groups of 6 people.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, and Division 01 – General Requirements.

1.2 SUMMARY

.1 This section specifies requirements and instructions that are common to Electrical Division of the Specification and it is a supplement to each section and is to be read accordingly.

.1 Any item or subject which is shown, mentioned, or reasonably implied on either drawings or in the specifications, is considered to be properly and sufficiently specified and shown; and must be provided. Provide all material, labour, equipment, tools, consumables, etc. required to complete all the Work of the electrical division.

.2 These common Works relate to all scope of Work related within the Electrical Divisions which incorporates:

.1 Electrical drawings

.2 Division 26 Electrical specification

.3 These common Works also have the following sections which are applicable to all sections within this division and supplement this section:

.1 26 05 03 – Electrical Work Testing

.2 26 05 05 – Demolition and Revision Work

.3 26 05 53 – Identification for Electrical Systems

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Division 02 Existing Conditions

.2 Division 26 Electrical

.3 Measurement and Payment:

.1 If a change to the Work is requested, the Contractor to submit pricing for the change including an itemized list of the associated material and labour changes and costs. Apply mark-up as indicated in the Contract.

.2 A change must be approved by the Contractor before the Work is to proceed. If Work is performed without such approval, it is performed at the Contractor's or Sub-Contractors' risk.

.3 In the event of a disagreement by the Contractor over valuation of the change in Work, resolution will follow the procedure outlined below:

.1 Labour hours are derived using the RSMeans Electrical Costing Book.

.2 Labour rates are as stated in the Instructions to Bidders.

.3 Material prices are "Trade" prices provided by a local supplier or distributor.

.4 Material requirements are obtained from field measurements.

.5 Major equipment prices are reasonably negotiated.

.4 Progress Payment Breakdown:

.1 Submit, prior to submittal of the first progress payment draw, a breakdown of the cost of the electrical Work to assist the Consultant in reviewing and approving monthly progress payment claims.

.2 The payment breakdown is subject to the Consultant's approval and progress payments will not be processed until an approved breakdown is in place. The breakdown is to include one-time claim items such as mobilization and demobilization, insurance, bonds (if applicable), shop drawings and product data sheets, commissioning, and project closeout submittals.

.3 Breakdown to include the following line items as a minimum:

.1 Job costs (permits, bonds, mobilization, supervision, and job foreman)

.2 Demolition and relocation

.3 Mechanical equipment wiring (to include starters, motor control centres, disconnect switches, and wiring)

.4 Electric heating

.5 Miscellaneous equipment, systems, and associated wiring

1.3 REFERENCES

.1 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 is "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 is "approved by", "inspected by", etc., the Consultant.

.4 In the electrical specification, singular may be read as plural, and vice-versa.

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this division. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute (ANSI):

.1 ANSI/ASHRAE/IES 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings

.2 Canadian Standards Association (CSA):

.1 CAN/CSA-Z32 – Electrical Safety and Essential Electrical Systems in Healthcare Facilities

.2 CAN/CSA-Z317.10 – Handling of Waste Materials in Healthcare Facilities

.3 CAN/CSA-Z317.13 – Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities

.4 CAN/CSA-Z8001 – Commissioning of Healthcare Facilities

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Plan Work well in advance to eliminate delivery, installation and co-ordination difficulties. Be held equally responsible with other sections or divisions to resolve interferences and to co-operate with other Sections to satisfactorily complete the project. Being there first will not be accepted as a legitimate reason.

.2 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 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.

.3 Drawings and Specification:

.1 Read the electrical Work drawings in conjunction with all Work drawings including but not limited to civil, landscaping, structural, architectural, sprinkler, and mechanical.

.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 is 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. Include cost for all offsets, fittings, transformations, and similar products required as a result of obstructions and other civil, 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. Include cost to meet requirements of the equipment and/or materials, other equipment or systems being installed, and of the building.

.5 Sections of the Electrical Division 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.

.4 Coordination:

.1 Relation to other sections:

.1 Provide all excavations, trenching, backfilling and compaction required for the Electrical Divisions at the Division's expense, unless otherwise specified or shown. Backfill all excavations in layers with clean materials 100 mm (4 in) sand bed and cover for direct buried conduit and be power compacted to a minimum 95% proctor 100% within building perimeter) unless specified to be higher elsewhere. Restore to original condition all surfaces, landscaping, etc., disturbed by excavation Work. When working inside the building perimeter or near existing services, protect existing construction and services to prevent damage; hand excavate where applicable.

.2 Provide all cutting and patching required for the section Work by the appropriate trade at the expense of the Electrical Division, unless otherwise specified or shown. Refer to the Architectural Specifications and drawings for details of cutting and patching provisions and requirements.

.3 Provide all sleeves, inserts, hangers and core drilling of slabs, etc., required for completion of the section Work. Coordinate the location of inserts, sleeves, hangers, holes, back boxes, tubs, junction boxes, etc., with the respective section into whose materials they are being installed. Extend all floor and roof sleeves 100 mm (4 in) above the finished levels, unless noted otherwise. Complete all roof sleeves with roof flashing and rain shields to ensure a weatherproof seal.

.4 Cut holes and install sleeves for electrical installations piercing fire, smoke, thermal, exterior, and acoustic separations to minimum sizes.

.1 Install firestopping and smoke seals in accordance with Section 26 05 02 – Firestopping and Smoke Seals.

.2 Seal all gaps on both sides of the separation by a qualified tradesman using materials and methods described in the applicable specification section, to maintain the appropriate rating, acoustic, thermal bridge, or water resistance. All costs for such will be paid for by the Electrical Division.

.3 If an existing penetration is not properly sealed to these standards, either provide new penetration for Work and seal appropriately, or seal entire opening including existing penetrations. Where multiple divisions are penetrating the same separation, group services and share sealing costs where appropriate.

.5 Deliver all electrical equipment and fixtures to the site with the specified finish. Provide touch up painting of electrical equipment scratched on site. Finish painting of primed electrical equipment and all concealed or exposed conduit, boxes, etc., as required will be provided by this division. Where finish painting and priming is within existing exposed ceiling, cost to be carried by this division.

.6 Immediately wrap and seal in plastic "bubble" wrap all fixtures, equipment, and system components delivered to the site and not contained in sealed cardboard cartons. Following installation, the items will be protected from dirt, dust, and damage with similar plastic wrap or protective enclosures until energized and put into full operation.

.7 Coordinate installation of switches, thermostats, and other devices together at one common location with installing sections and obtain approval on site from the Contractor of exact arrangement.

.8 The Electrical drawings do not generally show any Structural or Architectural details. Take any information involving accurate measurements of the building and site from the dimensional drawings.

.9 Dimensioned details and elevations generally take precedence over other conflicting details. However, where a conflict exists, clarify before starting installation. Make changes required to equipment or the installation, due to the Architectural or Structural details, without additional charges or expense to the Owner.

.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. Install cable tray used for extra-low voltage cables as low as possible where removable finished ceilings are installed. 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.

.5 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.

.6 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, PCBs, or other hazardous material: 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 Contractor and cease all Work in the area in question. Do not resume Work in affected areas until the material is properly identified as non-hazardous or the situation has been properly corrected with written approval from the Owner.

1.5 SUBMITTALS

.1 Submittals under this division to be in accordance with Section 01 33 00 – Submittal Procedures.

.2 Regulatory Communications:

.1 Forward to the Contractor copies of all correspondence and instructions from the Electrical Authority or any other Authority having Jurisdiction for clarification and action.

.3 Shop Drawings/Product Data:

.1 Shop drawings are those prepared specifically for the Project. Product data sheets are copies of manufacturer’s standard catalogue or literature.

.2 Shop drawings and product data sheets must confirm that the product proposed meets all requirements of the Contract Documents.

.3 Submit for review shop drawings and product data sheets, in electronic PDF format, covering all items or equipment to be installed under the Contract (faxed and generic documents are not acceptable). Shop drawings and product data sheets to show all physical properties, relevant performance, and installation information. The drawings and data required to generally be as outlined under each section of the Specification but will not be restricted to the items listed. Distribute reviewed shop drawings and data sheets to other relevant sections as required for completion of their related Work.

.4 All submitted shop drawings and data sheets must have been reviewed in detail by the Contractor and must bear their stamp. Should the drawings not have been reviewed and stamped, they will be rejected immediately.

.5 Each shop drawing or product data sheet is to be properly identified with the project name and the product drawing or specification reference, for example "Lighting Fixture F1", and all shop drawing or product data sheet dimensions are to be either metric or imperial to match dimensions on the drawings.

.6 Equipment will not be accepted on site until review of shop drawings and data sheets is complete. shop drawings or data sheets marked “Reviewed as Modified” are conditionally approved such that the Contractor to ensure equipment satisfies all Contract requirements. Delivery of equipment may proceed but final, corrected shop drawings and data sheets must be submitted prior to close of Contract.

.7 This review is for the sole purpose of ascertaining conformance with the general design concept. This review will not mean that the reviewer approves the detail design inherent in the shop drawing, responsibility for which will remain with the section submitting same, and such review does not relieve the Electrical Division of their responsibility for efforts or omissions in the shop drawings and data sheets or of their responsibility for meeting all requirements of the Contract Documents. The Electrical Division is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication processes or to techniques of construction and installation, for all quantities indicated and for co-ordination of the Work of all Sections.

1.6 CLOSEOUT SUBMITTALS

.1 Submittals under this Section shall be in conformance with Section 01 77 00 – Closeout Procedures.

.2 Operation and Maintenance Manuals:

.1 Forward to the Contractor “Maintenance and Instruction Manuals” within four (4) weeks of substantial completion of the project.

.2 Provide all closeout submittals in a digital format. Organize all individual electronic documents in directories similar to the tabs in a binder and filenames in plain English describing of the contents within each file. Provide all documents in unsecured PDF format with searchable text. Provide all audio and video content encoded in a format that can be viewed using standard codecs freely available on the most current version of Microsoft Windows operating system.

.3 Each manual will contain, but not be restricted to, the following information:

.1 each shop drawing (revised as per the reviewed drawings)

.2 each product data sheet (revised as per the reviewed drawings)

.3 operating and maintenance instructions

.4 Provide qualified technicians to instruct the Owner’s Representatives in the operation and maintenance of the systems and equipment included in the Electrical Division.

.3 Warranty Documents:

.1 Provide to the Consultant, all specified warranties, extended warranties, and free manufacturer extended warranties as applies to each individual section.

.2 The warranty period(s) commences on the date of Substantial Performance of the Work and shall be valid for the full duration specified.

.3 Submit warranties to the Consultant prior to Final Payment Certification.

.4 Record Documents:

.1 As-Built Drawings:

.1 During the progress of the Work the Electrical Division will always keep on the site, a complete and separate set of prints and will note thereon clearly, neatly, accurately and promptly all Architectural, Structural, Mechanical and Electrical changes, revisions and additions to the Work and deviations from the Contract Documents.

.2 Include accurate locations, depth, size, content, and type of all below grade pathways in these as-built drawings.

.3 Indicate also on the as-built drawings the location of access panels or removable ceiling tiles which cover equipment or junction boxes which may require future access or where conduit or wiring for future use is located.

.4 Prepare the final as-built drawings by a qualified draftsperson in AutoCAD at the contractor’s expense as an electronic copy and one hard copy to be submitted to the Contractor at the completion of the project with an application for a Certificate of Total Performance.

.5 Submit as-built drawings in electronic format. All documents will be in both AutoCAD and unsecured PDF format.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 All Work carried out under this Contract will comply with, but not be limited to the requirements of the latest edition of the following codes and regulations:

.1 Ontario Electrical Safety Code complete with Bulletins and Amendments.

.2 Ontario Building Code complete with Supplemental Bulletins and its referenced standards.

.3 Applicable Standards from CSA, ULC, and from other standards organizations indicated herein.

.4 All applicable Federal, Provincial, Municipal and Industry standards and regulations.

.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, or bear a stamp to indicate special electrical authority approval.

.3 Requirements of the Contract Documents are to take precedence when they are more stringent than codes, ordinances, standards, and statutes.

.2 Qualifications:

.1 Installer's:

.1 Installer/Applicator/Erector to have a minimum of 5 years' continuous Canadian experience successfully completing projects similar in size and complexity as the Work of this Division. Submit proof of experience upon Consultant's request.

.2 Provide all Work for Division 26 Electrical by qualified journeyman electricians or apprentices, holding valid provincial Certificates of Qualification, and be supervised by a competent foreman.

.3 Provide all Work for Division 27 Communications and Division 28 Electronic Safety and Security by qualified technicians with documented certifications by manufacturers of equipment being installed and be supervised by a competent foreman.

.4 The Work of the Electrical Division will be reflected in the quality of installations - any unsatisfactory installations will be removed and replaced accordingly.

.5 Provide all changes or alterations to the installations of this project required by an authorized Inspector of an Authority Having Jurisdiction in accordance with the terms and conditions of Contract.

.3 Certifications:

.1 Obtain all permits and certificates bearing upon this Trade and pay all fees and charges for same.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials of this Division in accordance with Section 01 61 00 – Common Product Requirements.

1.9 PROJECT CONDITIONS

.1 Existing Conditions:

.1 Visit the site of the building and examine the existing conditions in relation to the Work to be done. The Electrical Division to be responsible to allow for any requirements which could have been revealed during such examinations.

.2 Prepare a complete set of Interference drawings in co-ordination with other sections for all typical or critical locations to indicate site installation conditions where space is limited. Use field measurements to indicate accurate dimensions and configurations of all Electrical services in relation to Structural and Architectural conditions as well as Mechanical services. Coordination with other sections in the preparation of drawings and layout of the related Work is imperative. Submit these interference drawings to the Contractor for review prior to proceeding with any related Work, according to normal shop drawing procedure.

1.10 WARRANTY

.1 All materials and installations of the Electrical Division will be guaranteed for a period of one year from the date of final acceptance of the Work unless otherwise specified, regardless of the extent of equipment manufacturer's warranties.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Alternate Manufacturers:

.1 In some sections of this specification, materials and equipment are specifically described and named by manufacturer for the purpose of establishing a minimum standard of materials, product quality and other specified requirements.

.2 The project systems design as per the drawings and Specifications is based on the specified manufacturer's equipment but is intended to be appropriate for equivalent equipment of all other manufacturers contained listed in the approved manufacturers list within each Section.

.3 Products of manufacturers listed as "Alternates" are subject to product data and shop drawing review to ensure that they are equivalent to the products of the specified manufacturer. Alternate manufacturer's equipment will conform to the space limitations imposed by the project and the intent as outlined in this Specification and drawings.

.4 The Electrical Division is encouraged to submit alternative proposals of manufacturers not listed in the Approved Manufacturers List of proposals or modified design with appropriate costs, delivery, and system design adjustments which they feel may be advantageous considerations for the project.

3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions:

.1 Examine all Work of other sections upon which the Work of each section depends.

.2 Do not proceed with installation until all wet Work such as concrete and painting has been completed and thoroughly dried.

.3 Report in writing to the Consultant/Project Manager any defects of surfaces or Work prepared by other Sections which affect the quality or dimensions of the Work of each Section.

.4 Do not proceed with Work of each section until all unsatisfactory conditions have been rectified and site conditions are ready to receive Work.

.5 Commencement of Work implies acceptance of existing conditions and Work by other sections.

3.2 PREPARATION

.1 Protection of in-place conditions:

.1 Provide temporary protection of adjacent areas and surfaces by means of masking (enclosures) where necessary to prevent contamination by Work of each section.

3.3 INSTALLATION

.1 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.

.2 Scaffolding, Rigging, And Hoisting:

.1 Unless otherwise specified or directed, supply, erect and operate all scaffolding, rigging, hoisting equipment and associated hardware required for your Work. Immediately remove from the site all scaffolding, rigging, and hoisting equipment when no longer required.

3.4 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Conduct field inspection and testing as specified in Section 01 40 00

.2 Non-Conforming Work:

.1 Defective materials or quality of Work, whenever found, at any time prior to acceptance of the Work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.

.2 Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to the satisfaction of the Consultant at no additional cost to the Owner.

.3 Manufacturer Services:

.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.

3.5 SYSTEM STARTUP

.1 Preform all testing in accordance with Section 26 05 03 – Electrical Work Testing.

.2 Conduct acceptance tests to demonstrate that the equipment and systems meet the specified requirements. Conduct tests as soon as conditions permit. Make all changes, adjustments or replacements required as the preliminary tests may indicate.

.3 Operate all the equipment under normal conditions for a minimum period of five days as a start-up test. Defects disclosed must be repaired and tests repeated until pronounced satisfactory.

.4 Conduct final acceptance tests in the presence of the Contractor. Invite Consultant and Owner to attend with a minimum of one week's notification.

.5 Provide the services of one journeyman electrician and all ladders, tools, consumables, and associated equipment to assist the Contractor in carrying out the test.

3.6 ADJUSTING

.1 Adjust moving or operating parts to operate/function smoothly and properly.

3.7 CLEANING

.1 Waste Management:

.2 Remove all excess materials from site as Work proceeds and at completion.

.3 On completion of the Work remove all tools, containers, surplus materials, equipment, waste, etc.; and leave site neat, clean, and tidy to the satisfaction of the Owner.

.4 Clean and make good surfaces soiled or otherwise damaged because of Work of each section at no additional cost to the Owner.

.5 Leave surfaces clean and ready for subsequent Work.

3.8 CLOSEOUT ACTIVITIES

.1 Equipment and System Commissioning:

.1 After successful start-up and prior to Substantial Performance, commission the electrical Work in accordance with requirements of CSA Z320, Building Commissioning. Use commissioning sheets included with the CSA Standard, and any supplemental commissioning sheets required. Submit final commissioning data sheets, project closeout documents, and other required submittals.

3.9 PROTECTION

.1 Protect installed materials to prevent damage by other trades for the duration of the construction period. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 and Section 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 This section specifies fire stopping and smoke seal 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 REFERENCES

.1 Acronyms/Abbreviations:

.1 MSDS: Material Safety Data Sheet

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S101 Standard Method of Fire Endurance Tests of Building Construction and Materials

.2 CAN/ULC-S115 Standard Method of Fire Tests of Firestop Systems

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with Section 26 05 00 Common Work Results for Electrical.

.2 Product Data:

.1 Submit manufacturer's Product data sheets and MSDS for Products proposed for use in the Work of this section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

1.5 CLOSEOUT SUBMITTALS

.1 Submittals under this section shall be in conformance with Section 26 05 00 Common Work Results for Electrical.

.2 Test and Evaluation Reports:

.1 Submit a letter of proper firestopping and smoke seal certification as specified in Part 3 of this section.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer:

.1 Installer shall have a minimum of 5 years' continuous Canadian experience successfully completing projects similar in size and complexity as the Work of this section. Submit proof of experience upon Consultant's request.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable Manufacturers:

.1 A/D Fire Protection Systems "FIREBARRIER"

.2 Tremco Fire Protection Systems "TREMstop"

.3 3M "Fire Barrier"

.4 Hilti Firestop Systems

.5 Specified Technologies

.2 Requests for substitutions shall be made in conformance with Section 26 05 00 Common Work Results for Electrical.

2.2 MATERIALS

.1 Firestopping and Smoke Seal System Materials:

.1 Asbestos-free elastomeric materials tested, listed and labelled by ULC in accordance with CAN4-S115, Standard Method of Fire Tests of Firestop Systems and CAN/ULC-S101, Standard Method of Fire Endurance Tests of Building Construction and Materials for installation in ULC designated firestopping and smoke seal systems to provide a positive fire, water and smoke seal, and a fire-resistance rating (flame, hose stream and temperature) not less than the fire resistance rating of surrounding fire rated construction.

.2 Materials are to be compatible with abutting dissimilar materials and finishes and complete with primers, damming and back-up materials, supports, and anchoring devices in accordance with the firestopping manufacturer's recommendations and the ULC tested assembly.

3 EXECUTION

3.1 PREPARATION

.1 Abide by the following requirements:

.1 examine substrates, openings, voids, adjoining construction and conditions under which the firestop and smoke seal system is to be installed, and confirm compatibility of surfaces

.2 verify penetrating items are securely fixed and properly located with the proper space allowance between penetrations and surfaces of openings

.3 report any unsuitable or unsatisfactory conditions to the Contractor and Consultant in writing, prior to commencement of Work, and note that commencement of Work will mean acceptance of conditions and surfaces

.4 mask where necessary to avoid spillage and over coating onto adjoining surfaces, and remove stains on adjacent surfaces

3.2 INSTALLATION

.1 Where electrical Work penetrates fire rated construction, provide ULC listed and labelled firestopping and smoke seal materials installed in accordance with requirements of CAN4-S115 (ratings F, FT, FH, and FTH as required), CAN/ULC-S101, and all other governing authorities to seal the penetrations.

.2 Application: Conform to the following application requirements:

.1 use an experienced applicator approved by the manufacturer of the firestopping material manufacturer

.2 prime substrates in accordance with the product manufacturer's written instructions

.3 provide temporary forming as required and remove only after materials have gained sufficient strength and after initial curing

.4 tool or trowel exposed surfaces to a neat, smooth, consistent finish

.5 remove excess compound promptly as Work progresses and upon completion

.6 at all cable transit locations, seal the perimeter of the angle iron framing on both sides of the wall or slab with ULC listed and labelled sealant materials to provide a positive smoke seal

3.3 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Notify the Consultant when the Work is complete and ready for inspection, and prior to concealing or enclosing firestopping and smoke seal materials and service penetration assemblies. Arrange for final inspection of the Work by the Municipal Building Inspector prior to concealing or enclosing Work. Make any corrections required.

.2 Non-Conforming Work:

.1 Defective materials or quality of Work, whenever found, at any time prior to acceptance of the Work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.

3.4 CLOSEOUT ACTIVITIES

.1 Certification:

.1 On completion of the firestopping and smoke sealing installation submit a letter of assurance to the Consultant certifying that the firestopping and smoke sealing installation has been carried out throughout the building to all electrical service penetrations and that the installation has been done in strict accordance with the requirements of the Provincial Building Code, any applicable local Municipal Codes, ULC requirements, and the manufacturer's instructions.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide electrical Work testing, including but not limited to the following:

.1 General Electrical Work Testing

2 EXECUTION

2.1 INSTALLERS

2.2 PREPARATION

.1 Protection of In-Place Conditions:

.1 Provide temporary protection of adjacent areas and surfaces by means of masking (enclosures) where necessary to prevent contamination by Work of this section.

2.3 SITE QUALITY CONTROL

.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.

.6 Review the existing distribution equipment and, where possible, obtain the existing distribution system coordination study to determine the best coordination between the existing and new equipment. If an existing coordination study is not available, survey the existing equipment and prepare calculations of proper coordination between the new and existing equipment. Where defective or incorrectly applied relays or breakers are found, clearly identify the problem on curves submitted with the report and suggest a recommended course of action.

.7 The on-site test and coordination study of distribution system protective devices is to include, as applicable:

.1 testing, cleaning when necessary, and calibrating relays and circuit breaker trip devices (calibration) of protective devices is to conform to requirements of approved coordination (curves).

.2 a function test of associated control device

.3 replacement of any fuses destroyed during tests.

.4 an acceptance test in the presence of and to the satisfaction of the Consultant

.5 the presence at the site, for the length of time required, of qualified equipment manufacturer's representatives.

.6 an insulation resistance test of "load" side feeders with respect to ground

.7 testing of motor control centres, motor starters, and where supplied as part of the electrical Work, viable speed drives

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 and Section 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.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 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA S350 Code of Practice for Safety in Demolition of Structures

2 EXECUTION

2.1 EXAMINATION

.1 Verification of Conditions:

.1 Examine all Work of other sections upon which the Work of this section depends.

.2 Report in writing to the Consultant/Project Manager any defects of surfaces or Work prepared by other sections which affect the quality or dimensions of the Work of this section.

.3 Do not proceed with Work of this section until all unsatisfactory conditions have been rectified and site conditions are ready to receive Work.

.4 Commencement of Work implies acceptance of existing conditions and Work by others.

2.2 PREPARATION

.1 Protection of In-Place Conditions:

.1 Provide temporary protection of adjacent areas and surfaces by means of masking (enclosures) where necessary to prevent contamination by Work of this section.

.2 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 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.

.3 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.

.4 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.

2.3 CLEANING

.1 Complete cleaning of this section in accordance with Section 26 05 00 Common Work Results for Electrical.

2.4 PROTECTION

.1 Protect installed materials to prevent damage by other trades for the duration of the construction period. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide wire and cable, including but not limited to the following:

.1 This Section, "Wire and Cable", shall apply to all systems of this Contract. Variations or alterations of the requirements for a system, will be specified in that system section.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 05 53 – Identification for Electrical Systems

.2 Section 26 05 33 – Raceway and Boxes for Electrical Systems

.3 Section 27 10 00 – Structured Cabling

1.3 CLOSEOUT SUBMITTALS

.1 Submittals under this Section shall be in conformance with Section 26 05 00.

.2 Record Documents:

.1 Manufacturer’s letter stating the “MI” cable has been properly installed, tested, and is ready to be energized.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Provide local motor and equipment disconnecting switches or devices for all items regardless of Electrical Code exceptions for mechanical equipment, architectural equipment, Owner purchased equipment and system control panels. The wiring for equipment schedules and drawings do not indicate these disconnecting switches or devices. Some equipment items have integral disconnect switches provided and pre-wired with the equipment. In case of equipment manufacturer supplied disconnecting switches, issue a full credit to the contract to delete the switches specified under this section.

.2 Wiring for Mechanical Equipment:

.1 Refer to the "Wiring for Mechanical Equipment Schedule", for the schedule of devices and wiring to be provided.

.2 Wiring for mechanical equipment as described in the specification and as indicated on the drawings are based on the specified mechanical equipment. Wiring for this equipment shall not commence until approved wiring diagrams have been obtained

.3 Provide all required 120 V control equipment and wiring. Only line voltage components built-in to the equipment by the manufacturer or included under the controls or Equipment Sections of mechanical Work will be provided by the Mechanical Division. In general, the Mechanical Division will provide all low voltage (24 V or less) control equipment and wiring and all pneumatic control devices and tubing unless otherwise indicated.

.4 Should alternate equipment other than the specified equipment be substituted all alterations to the wiring incurred by the said substitution will be provided at the Mechanical Division's expense. All changes and costs incurred by the substituted equipment, will be subject to the Contractor's approval.

.5 Remote push buttons, pilot lights, and control devices in finished areas shall be heavy duty oil tight devices and contact blocks in flush wall mounted boxes 1100 mm (43 in) above floor level, and finished with stainless steel covers.

.3 Wiring for Architectural/Owner Purchased Equipment:

.1 Provide labour and materials to supply power to Architectural or Owner purchased equipment and make the necessary electrical connections. Provide an approved receptacle circuit termination device, disconnect switch, etc. to suit the item requirements. Also install and wire remote control devices for this equipment as noted on the drawings. Refer to notes on the Electrical Drawings and the Equipment Wiring Schedules for further details. Wiring requirements as indicated are based on the specified equipment. Wiring for this equipment shall not commence until approved equipment shop drawings identifying connection point, outlet requirement, rating and wiring diagram have been received.

.2 Provide a power supply to each electrically operated door, dock leveller, etc., terminating in a disconnect switch at the equipment connection point. The equipment supplier will provide the control devices, starters, limit switches, etc., for installation. Complete the wiring between components according to the equipment supplier’s wiring diagram.

.4 Wiring for Elevator/Lift:

.1 Provide protected power supply and local fused disconnect switch for elevator/lift controller. Provide approved auxiliary contact block (Commander) inside switch enclosure on operating mechanism for electrical indication of switch off condition. Provide power supply wiring from disconnect switch and auxiliary contact to controller.

.2 Provide protected power supply and local fused disconnect switch for elevator car lighting. Provide power supply wiring from disconnect to controller.

.3 Provide a telephone outlet next to the elevator controller for elevator car emergency telephone.

.4 Provide wiring terminated in appropriate electrically held relays with convertible contacts in elevator machine room from fire alarm system for special function operation. Provide wiring from relay to controller.

.5 Verify all component location and wiring requirements with the Elevator Installer prior to installation. All connections to elevator equipment shall be made as directed by Elevator Installer and only in his presence.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer's:

.1 For installation of Mineral Insulated Wire, persons trained and experienced with this product will be employed in its installation.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Storage and Handling procedures:

.1 Mineral Insulated Wiring must be stored in a dry location. The ends of the wire must be packed and wrapped to keep all moisture from penetrating the magnesium oxide insulation.

2 PRODUCTS

2.1 MATERIALS

.1 Distribution And Branch Circuit Conductors:

.1 Conductors to and including 10 AWG are to be solid or stranded type. Conductors larger than 8 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 "AC-90" 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.

.4 "MI" ULC 2 hour fire rated conductor in accordance with CSA C22.2 No. 124, Mineral-Insulated Cable, 90° C (195° F) rated, consisting of a solid copper conductor, magnesium oxide insulation, a seamless soft drawn copper sheath, and terminations supplied by the cable manufacturer.

.5 "FAS" cable in accordance with requirements of CSA C22.2 No. 208, Fire /Alarm and /Signal Cable, FAS90 shielded or un-shielded as required, 90° C (195° F) rated, consisting of a copper conductor, silicone rubber insulation, and a polyolefin outer jacket.

.6 Equal to Nexans Canada "Corflex" II RA90 flexible cable (or approved equivalent) in accordance with requirements of CSA C22.2 No. 123, Aluminium Sheathed Cable, consisting of single or multiple copper conductors with X-link polyethylene insulation enclosed in a liquid and vapour-tight solid corrugated aluminium sheath and, as required, an overall PVC jacket.

.7 Equal to Nexans Canada “Firex II” TECK 90 cable (or approved equivalent) in accordance with requirements of CSA C22.2 No. 131, Type TECK 90 Cable, consisting of single or multiple copper conductors with X-link polyethylene insulation enclosed in a liquid and vapour-tight solid corrugated aluminium sheath and, where required, an overall PVC jacket.

.8 “NMD90” flexible cable to CSA C22.2 No. 75, with 90° C (195° F) rated, Thermoplastic-Insulated conductors, a ground conductor, and overall PVC jacket.

.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 (or approved equivalent) 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.

.3 Communications Cable:

.1 All cabling used for Ethernet, Telephone, or other IP-based systems shall follow cabling requirements as outlined in 27 10 00 Structured Cabling.

.3 Connectors:

.1 Conductors in Conduit: Except as noted, CSA certified flame resistant thermoplastic, colour coded twist type connectors to suit the system voltage and wire gauge.

.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: Connector and termination hardware supplied by the cable manufacturer to suit the application.

.5 Corflex/Teck Cable (or approved equivalent): Connector and termination hardware supplied by the cable manufacturer to suit the application.

.4 Conductor Pulling Lubricant:

.1 Equal to Ideal Industries “Yellow 77” or “ClearGlide” (or approved equivalent), as required.

3 EXECUTION

3.1 INSTALLATION

.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 or duct use lubricant and ensure that the conductors are kept straight and are not twisted.

.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 where multiple conductors are spliced:

.1 use properly sized Wing Nut connectors, or approved equal, for up to two 8 AWG or three 10 AWG conductors

.2 use pressure type sleeve cable connectors, splices, tee's, etc. for all larger size connections and terminations

.4 insulate all bare surfaces of splices with Scotch No. 33 tape, heat shrink sleeving, or equivalent.

.5 conductors connected to ground rods for service or equipment grounding or to building structural or architectural elements to be terminated, connected and spliced using:

.1 a thermoweld process

.2 an approved non-mechanical compression type connectors where serviceable

.6 install service and feeder conductors as continuous lengths without breaks, measured and cut based on field-measured dimensions.

.7 do not splice mineral insulated “MI” cable

.8 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

.5 Conductor Termination:

.1 Where a single solid conductor is terminated in a device under one screw or clamping mechanism, no additional terminating hardware is required.

.2 Where multiple or stranded conductors are terminated in a device under one screw or clamping mechanism, self insulated crimpon cable ends or approved equal shall be used up to and including 10 AWG sized conductors. Approved compression lugs shall be used for larger conductor sizes.

.6 Grounding and bonding conductors:

.1 Insulated grounding or bonding conductors shall be the same type as the line conductors.

.2 Each feeder and branch circuit shall be provided with a separate ground conductor sized in accordance with Electrical Code regulations. All 120 V or 347 V (single phase) branch circuits shall be provided with a separate neutral conductor for each circuit.

.2 Installation of distribution and branch circuit conductors:

.1 Install 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 service conductors underground inside or outside the building, and in non-climate controlled areas – RWU-90

.2 conductors underground inside or outside the building, and in non-climate controlled areas – RW-90

.3 unless otherwise specified, conductors within stud wall construction, and in furniture systems to luminaries and wiring devices – AC90 flexible armoured cable, maximum 6 m (20 ft) run permitted

.4 for conductors in accessible ceiling spaces (not walls) to luminaries - AC90 flexible armoured cable, maximum 3 m (10 ft) run permitted

.5 for conductors except as specified above or elsewhere in the Specification or on the drawings – T90 Nylon or RW90

.3 Fire Rated Conductors: Unless otherwise specified herein or on the drawings, fire rated conductors are to be ULC 2-hour rated bare MI cable, installed for service as follows:

.1 conductors from engine-generator set to transfer switch

.2 power feeders to Firefighter's elevator(s)

.3 power feeders to fire protection pumps

.4 power connections to smoke ventilation/pressurization fans

.5 power feeders to emergency lighting panelboards

.6 power feeders to fire alarm panels and transponders

.7 fire alarm system risers and other feeders as shown or specified

.8 any other conductors as specified on the drawings

.4 "MI" Mineral Insulated Conductor Installation Requirements: Generally, install type "MI" mineral insulated conductors in accordance with the manufacturer's instructions and recommendation, including the following:

.1 provide proper clips, wall brackets, and other support hardware either shown or required

.2 terminate the cable using connectors and installation tools supplied by the cable manufacturer

.3 terminate cable immediately after installation to avoid moisture ingress

.4 do not splice “MI” cables

.5 obtain from the manufacturer a letter stating the “MI” cable has been properly installed, tested, and is ready to be energized, and submit the letter and test result sheets to the Consultant

.6 multiple single conductor mineral insulated cables shall be banded together at a maximum of 900 mm (36 in) intervals to form a free air rated feeder

.7 support at a maximum of 1500 mm (60 in) intervals; additional supports may be required to provide a straight and neat installation

.8 where the cable is exposed, locate as inconspicuously as possible, and run parallel to the building lines.

.9 terminate all cables using manufacturer's approved termination kits, tools and accessories and in accordance with manufacturer's instructions.

.10 following installation and termination of cables, test all cables for continuity, short circuits and grounds using a 1000 volt meggar for 15 seconds in the presence of the manufacturer’s authorized representative

.11 use non-ferrous plates to terminate single conductor cable sheaths at panels, switches, etc., for sizes above 2 AWG

.12 cable run underground to be surrounded by 150 mm (6 in) of compacted sand

.5 “Corflex” Cable Installation Requirements: Install “Corflex” cable in accordance with the manufacturer’s instructions, including the following requirements:

.1 support and secure overhead suspended “Corflex” cable on a system of cable tray where indicated.

.2 secure individual cables to cable tray, or where shown, directly to building surfaces by means of single screw non-ferrous clamps

.3 ground and bond single conductor cable at both ends where the sheath currents do not affect the cable ampacity

.4 for certain areas, where the sheath currents will reduce the cable ampacity, ground and bond the cable at the supply end and isolate the cable at the load end as recommended by the cable manufacturer, and provide a 3/0 AWG green TW ground conductor for each cable, all as per Section 10 of the Electrical Code

.6 “Teck” Cable Installation Requirements: Install “Teck” cable in accordance with the manufacturer’s instructions, including the following requirements:

.1 support and secure overhead suspended “Teck” cable tray where indicated

.2 secure individual cables to cable tray or, where shown, directly to building surfaces by means of single screw non-ferrous clamps

.3 terminate cable with lugs and termination kits supplied with the cable

.7 "NMD-90" Cable Installation Requirements: Install NMD-90 cable in accordance with the manufacturer's instructions, including the following requirements:

.1 install only in areas where combustible construction is used

.2 all cabling to be concealed, no surface or exposed cabling is permitted

.3 secure using only approved clips to joists or studs, do not compress or damage cable jacket

.4 secure cables every 1.5 m (5 ft) when run on the sides of joists or studs and 300 mm (12 in) from each outlet box

.5 where cables pass through a hole in a joist or a stud, bore the hole 32 mm (1.25 in) back from the face of the stud or joist, or protect the cables from screws or driven nails by using approved protection plates

.6 keep cables a minimum of 25 mm (1 in) from heating ducts or use insulation installed between the conductors and heat ducts

.7 where cables run through or along metallic studs, joists, sheathing or cladding, ensure that the cables are:

.1 protected from mechanical damage both during and after installation

.2 protected by an insulation insert secured to the opening in the stud

.8 protect cables from mechanical damage and from driven nails and screws when they are installed behind baseboards or horizontally behind cupboards

.9 where communication cables are to be installed in joists or studs, maintain a minimum separation of 50 mm (2 in); cables may not share same pass-through hole

.8 Conductor Sizing:

.1 do not use conductors smaller than 12 AWG in systems over 30 volts.

.2 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.

.3 all branch circuit wire feeding a 20 A protected lighting circuit to be minimum 10 AWG wire.

.4 all branch circuit wiring feeding a 15 A protected circuit which is over 45 m (150 ft) in length to be minimum 10 AWG wire.

.5 do not use conductors smaller than 8 AWG for exterior luminaire wiring.

.3 Voltage Drop:

.1 Voltage drop in power and control conductors shall be in accordance with the requirements of the Electrical Code. Size conductors, splicing kits, and termination lugs accordingly when sizes are not identified.

.2 Maximum branch wiring distance from panel to load in metres for 120 V single-phase system at 2% voltage drop based on indicated wire size:

Breaker Size (A)	15	20	30	40	50
Max load at 80% (A)	12	16	24	32	40
12 AWG	16.8	12.2	---------	---------	---------
10 AWG	25.9	19.0	---------	---------	---------
8 AWG	39.6	30.4	12.9	---------	---------
6 AWG	62.4	47.2	32.0	23.6	19.0
4 AWG	99.0	73.1	50.2	38.1	30.4
2 AWG	-------	114.3	77.2	57.9	47.2
1 AWG	-------	-------	96.0	73.1	57.9
1/0 AWG	-------	-------	-------	85.3	68.5
2//0 AWG	-------	-------	--------	102.8	80.7
3/0 AWG	-------	-------	---------	---------	95.2

.3 Maximum branch wiring distance from panel to load in metres for 120 V single-phase system at 3% voltage drop based on indicated wire size:

Breaker Size (A)	15	20	30	40	50
Max load at 80% (A)	12	16	24	32	40
12 AWG	24.4	18.3	---------	---------	---------
10 AWG	38.1	29.0	19.1	---------	---------
8 AWG	59.4	44.2	30.5	22.9	---------
6 AWG	91.4	70.1	47.2	35.1	28.2
4 AWG	-------	109.7	73.2	54.9	42.7
2 AWG	-------	---------	114.3	85.3	68.6
1 AWG	-------	-------	--------	103.6	85.3
1/0 AWG	-------	-------	-------	128.0	102.9
2//0 AWG	-------	-------	--------	--------	122.9

3.2 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Conduct field inspection and testing as specified in Section 26 05 00

.1 Feeders and branch circuits rated 100 amperes or greater shall be checked with a 1000 V Meggar for 15 seconds before energization.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide raceway and boxes for electrical systems, including but not limited to the following:

.1 Electrical conduit system throughout the project unless indicated otherwise. The conduit systems shall consist of all the necessary conduit, fittings, fastenings, boxes, special supports, etc.

1.3 REFERENCES

.1 Abbreviations and Acronyms:

.1 EMT: Electrical Metallic Tubing

.2 FRE: Fibreglass Reinforced Epoxy

.3 GRC: Galvanized Rigid Metal Conduit

.4 PVC: Polyvinyl Chloride

.2 Definitions:

.1 Conduit - The definitions of "Conduit" (Rigid Metal, Rigid PVC, Rigid FRE, Flexible, and Electrometallic Tubing) as defined in the Electrical Safety Code. Other definitions shall be as follows.

.2 Slabbed Conduit - Conduit which is installed within a monolithic concrete floor slab. No slabbed conduit shall be allowed to be installed for this project - use underground conduit where approved.

.3 Underground Conduit - Conduit or duct which is installed below the finished earth grades or below the lower edge of an on grade or subgrade floor slab.

.3 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 05 43 Underground Ducts and Ductbank

2 PRODUCTS

2.1 MATERIALS

.1 Conduit, Connectors and Fittings:

.1 Use conduit, connectors, and fittings as standard in the trade, unless noted herein or on the drawings to be of a specific type, manufacturer, trade name, series or catalogue number.

.2 Galvanized Rigid Metal Conduit (GRC):

.1 All fittings to be threaded type. Supply bushings with insulated plastic lining for all conduit terminations.

.2 Electric Metallic Tubing (EMT):

.3 All fittings to be steel set screw or raintight type. Supply bushings with insulated plastic lining for all conduit terminations.

.3 Flexible Conduit:

.1 All box connections to have either a nylon lined connector or be provided with an insuliner sleeve. Include sealing ring for fully sealed connection for liquid tight type.

.2 Supply metallic liquid tight type for all exposed flexible conduit.

.3 Supply non-metallic type flexible conduit for inside concrete block walls.

.4 Concealed flexible conduit to be approved galvanized steel or aluminum (where approved) interlocking type, minimum size 12 mm (1/2 in).

.4 Rigid PVC:

.1 Use approved rigid PVC fittings with solvent cement connections for all joints.

.5 Outlet Boxes:

.1 Use outlet boxes, junction boxes, etc. of the types approved for the application. Use the following types for the noted applications:

.1 Recessed boxes in concrete or masonry - Type MBD or MBS boxes.

.2 Surface mounted with EMT conduit - Type 1110 or 2020 "Utility" box.

.6 Miscellaneous:

.1 Rigid Metal Expansion Joint - Crouse Hinds "XJ" series with bonding strap or equivalent.

.2 Rigid PVC Expansion Joint - Scepter "O" Ring expansion joint "EJ" series or expansion coupler "EC" series, to suit expected length of movement.

3 EXECUTION

3.1 INSTALLATION / APPLICATION

.1 Application

.1 Galvanized Rigid Metal Conduit (GRC):

.1 Raceway sizes larger than 103 mm (4 in) diameter above grade.

.2 Where installed as an exterior branch circuit above finished grade.

.3 In hazardous locations (complete with sealing type fittings) as classified by the Electrical Code or the Electrical Authority.

.2 Electric Metallic Tubing (EMT):

.1 Conduit sizes 103 mm (4 in) and less, where not specified or required to be otherwise due to special applications or conditions.

.2 To carry branch circuit wiring from local distribution or lighting panels to area circuit junction boxes above ceiling systems.

.3 Flexible Conduit:

.1 As branch circuit wiring from area circuit junction boxes above ceiling systems to light fixtures and from outlet boxes to suspended fixtures.

.2 Restrict flexible conduit to less than 3600 mm (12 ft) in length. Suitably clip and support every 900 mm (3 ft) in length the flexible conduit used above ceiling systems.

.3 As a raceway in stud walls or partitions.

.4 Do not use flexible conduit where conduit is run exposed.

.4 Liquid tight flexible Conduit:

.1 As the raceway between the distribution conduit and equipment terminal boxes of vibrating and rotating equipment.

.2 Restrict length to be less than 600 mm (24 in).

.5 Rigid PVC or Rigid FRE Conduit:

.1 As an underground raceway for building services or as a slabbed conduit where approved.

.6 Rigid PVC Conduit:

.1 As underground raceways for branch circuit wiring to exterior connections.

.7 Rigid PVC Duct (DBII):

.1 Use in sizes 50 mm (2 in) and larger where encased in concrete or direct buried for underground communication utilities services.

.8 Use corrosion resistant conduit where indicated on the drawings.

.9 Do not use aluminum conduit on this project.

.2 Installation:

.1 Where more than one type of product or method of installation could apply, the most restrictive products and methods of installation shall take precedence.

.2 All conduit connections to be as tight as possible. Failure to tighten any conduit connections in block, tile or concrete elements will result in the element being removed and reinstalled at this Section's expense.

.3 Do not use the conduit system as the ground path for the building wiring system. Supply all wiring systems with a separate copper ground conductor sized accordingly to ensure ground path continuity.

.4 Conceal conduit in all finished wall areas but may be run exposed in service and equipment rooms.

.5 Where conduit is run exposed, run parallel to the building lines. Supply grouped concentric bends where two or more conduits are installed.

.6 Do not install conduit horizontally in masonry walls.

.7 Lay out all conduits and install to avoid the proximity of heating pipes and ducts. Do not run conduit within 900 mm (3 ft) of such pipes and ducts.

.8 Plug conduit ends during construction with plastic push pennies. Cap conduits stubbed for future use with conduit caps and seal, if below grade.

.9 Rigidly and securely support conduit systems with conduit straps to the building structure. Support multiple conduit runs, if not easily attached to the building structure directly, by Unistrut hanger assemblies. Bailing wire or flexible metal strapping will not be accepted.

.10 Concrete encased underground conduits shall be enclosed within a minimum 100 mm (4 in) monolithic poured concrete envelope.

.11 Install underground conduits that are below a building floor slab at a minimum depth of 460 mm (18 in) below the finished surface.

.12 Coordinate all underground conduit routes with other Sections to prevent interference. Install sleeves for all underground conduits passing through structural or foundation elements.

.13 Extend conduits stubbed through equipment bases a minimum of 38 mm (1½ in) above the base.

.14 Install two 32 mm (1¼ in) spare empty conduits stubbed into the ceiling space from the top of all recessed panelboards. Terminate in suitable junction box with blank cover labelled accordingly.

.15 Install a nylon pull cord in all empty conduits. Adhere tags at both ends indicating system and destination. Maintain a pull cord in systems conduits used only to partial capacity.

.16 Colour code all conduit systems throughout the building during installation with a patch of paint at all junction and pull boxes and points of concealment as follows:

.1 Black – Power Distribution (also indicate specific source/panel)

.1 Black/Green – 600/347 V Normal

.2 Black/Blue – 208/120 V Normal

.2 Red – Fire Alarm System (also indicate circuits)

.3 Orange – Emergency/Standby Power System (also indicate specific source/panel)

.1 Orange/Green – 600/347 V Emergency/Standby

.2 Orange/Blue – 208/120 V Emergency/Standby

.3 Orange/Purple – Uninterruptible Power

.4 Yellow – Public Address/Intercom/Audio-Visual Systems

.5 Green – Security System

.6 Purple - Controls

.7 Blue – Telecommunications System

.3 Underground Conduit:

.1 Install a copper ground conductor in all underground conduit.

.2 Connect underground conduit to rigid metal conduit elbows or be concrete encased at all points where a three-phase feeder or communications conduit comes through a floor slab, enters a building, or comes to the surface.

.3 Protect Rigid PVC conduit with steel sleeves or box out sections where they pass through foundation walls or footings.

.1 Do not use steel conduit or sleeves where single-phase cables are run separately.

.4 Drill and drain in a gravel sump at the low point of the run all underground ductbank runs. Slope away from the building all underground conduits with the low point outside of the building walls. It is preferred to have the low point occur at the furthest point from the building.

.5 Appropriately seal all underground conduit runs which enter walls below grade level at the exterior wall. Install conduits with an exterior water stop where they pass through an exterior building wall below grade.

.4 Rigid PVC Conduit:

.1 Bend on site using a non-flame type heat source to accommodate the required contours.

.2 Use conduit fittings, couplings, etc. that are watertight type, fastened with an approved cement.

.3 Do not penetrate fire rated walls, floors, or ceilings.

.5 Partition Walls:

.1 Feed all conduit in demountable, prefabricated or standard stud partition walls into the wall from the ceiling. Make no connections from the floor or walls unless shown on drawings. Terminate conduit in a junction box in the ceiling space within 900 mm (3 ft) of the ceiling system penetration point.

.2 Restrict flexible conduit in demountable or prefabricated partitions to a maximum 25 mm (1 in) size.

.6 Outlet Boxes:

.1 The location of outlets, fixtures, panels, etc., as shown on the drawings, are approximately correct, but the Consultant reserves the right to alter the location of any number of them up to 3000 mm (10 ft) without incurring extra cost, if altered before installation is commenced on any individual item.

.2 In general, Use 100 mm (4 in) octagon boxes for light fixture outlets.

.3 In concrete slabs or walls, use boxes greater than 50 mm (2 in) deep.

.4 In general, in fire rated partitions, install outlet boxes with openings no larger than 160 cm^2 (25 in^2) in area. Install outlet boxes on opposite side or same side of a fire rated partition offset at least one stud space to maintain the integrity of the fire separation.

.1 Refer to code plans indicating fire rated partitions

.2 Where openings exceed these criteria, install intumescent material that comply with ULC fire rated assemblies.

.5 Use watertight with screw fittings and watertight gaskets to install outlet boxes outside of the building.

.6 In general, install outlet boxes of adequate size and required dimensions for all outlet and conduit junctions.

.7 Rigidly secure all outlet boxes in position by approved methods. For those intended for hanging fixtures, supply with fixture studs, self aligning type for sloping ceilings.

.8 Outlet boxes designated for future use, install with blank-metal coverplates. Install coverplates, on outlet boxes designated for other than future wiring devices, in time to be painted over by the painting Section.

.9 Place all pull boxes and terminal boxes in inconspicuous but accessible locations.

.10 Centre all outlets, panelboards, lighting control, panels and equipment on construction panels, wood paneling or boarding, ceiling tile, etc.

.11 Install components or devices such as lighting controls and receptacles or thermostats, etc., which occur one above the other in the same general location, in the same vertical line.

.12 Install adjacent items such as panels and fire hose cabinets, etc., with the tops of their trims in line.

.13 Locate clocks, bells, horns, speakers, etc. as shown or specified. However, mount these items symmetrically in paneling or tiles, and bear proper relationship to doors, ventilation grilles, etc. Where specific heights are not covered, discuss the relation with, and approved by, the Consultant.

.14 In no case shall luminaires, pipes, ducts or other elements be allowed to obstruct clocks, grilles, exit lights, etc.

.15 Mount recessed or surface ceiling mounted components to replace full tiles where possible or be centred on the tile or grid intersections.

.16 Locate lighting controls on the latch side of door or primary leaf within 150 mm (6 in) of the jamb or sidelight. Where light controls are shown on hinge side of single doors, in cases where glazing makes placing the controls on the latch side not possible, ensure that lighting controls are within 150 mm (6 in) beyond door in fully open position and no part extends behind the open door. Verify door swings and primary leaves on double doors before proceeding with installation of the control box and associated conduit/wiring.

.17 Ensure all outlet boxes are installed with vapour barrier protection integral with specific wall or ceiling construction. For each outlet box installed which pierces a vapour barrier, supply an appropriately sized vapour barrier box surrounding outlet box to seal all air leaks and maintain vapour barrier continuity.

.18 In finished areas of the building, conceal as much conduit/wiring as possible. Where in this Section's opinion it is necessary or advantageous to run wiring on the surface, obtain approval from the Consultant before proceeding. Install all surface raceways as metal and manufactured by Wiremold unless otherwise indicated. Install surface raceways at size to suit conductors being carried. Use only approved components, fittings, and methods of securing, joining and supporting surface raceways and outlet boxes. Where surface mount raceways and outlet boxes are used, paint to match the specific wall or ceiling finish by the painting Section.

.7 Mounting Height:

.1 Where receptacles or other devices interfere with heating equipment, mount horizontally in the toespace below the heating unit unless otherwise noted.

.2 For mounting heights of the various system devices not indicated herein refer to the specific system Section or drawing detail.

.3 Verify mounting heights of outlet boxes in special or decorative wall systems prior to rough-in.

.4 For exact mounting heights and requirements of outlets and devices built into millwork or architectural furnishings, refer to elevations and details shown on the architectural drawings. Verify with millwork Section prior to rough-in.

.8 Conduit Seals:

.1 In areas where conduits pass through walls or other building surfaces in which different temperatures exist (i.e. refrigerated spaces or exterior walls and insulated ceilings or roofs, etc.), seal off the conduits with appropriate materials and methods to prevent breathing and subsequent condensation. Complete the sealing such that moisture is not trapped at the seal.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 (and Division 20 or 26).

1.2 SUMMARY

.1 Section includes: Provide identification for electrical systems, including but not limited to the following:

.1 Identification nameplates for all electrical apparatus such as: panels, motor starters, switchgear, transformers, disconnect switches, breakers, contactors, and system control panels.

.2 Directory cards for all panelboards such as: power, lighting, low voltage systems, and communications. All power and systems wiring shall be colour coded in accordance with this Section and be provided with appropriate wire markers identifying panel circuits.

2 PRODUCTS

2.1 MATERIALS

.1 Lamicoid Nameplates:

.1 All identification nameplates and nametags unless otherwise specified shall be engraved white letters on black lamicoid stock with bevelled edges. The lamicoid stock shall be 1.5 mm (1/16 in) minimum thickness.

.2 The nameplates shall be engraved with the following information:

.3 Nameplates for panel and cabinet identification shall typically include the following:

LP-A	13 mm (1/2 in) high lettering
120/208 VOLT	8 mm (5/16 in) high lettering
FED FROM MCC-1	8 mm (5/16 in) high lettering

.4 All other electrical equipment shall be typically identified as follows:

SUPPLY FAN SF-1	8 mm (5/16 in) high lettering
208 VOLT - 3 PHASE	8 mm (5/16 in) high lettering
FED FROM MCC-1	8 mm (5/16 in) high lettering

.5 The final wording of all nameplates shall be reviewed and approved by the Owner and Consultant prior to fabrication.

.2 Panel Directories:

.1 Each panel circuit directory card shall have clearly typed information as with the following example:

PANEL NAME:	LP-A
PANEL VOLTAGE:	120/208 VOLT – 3 PHASE
PANEL SUPPLY:	150 AMP

Circuit Number	Load	Room No. or Locations

1	Lighting	143
2	Receptacles	029
2	Supply Fan SF-4	Roof

.2 All systems distribution cabinets shall be complete with a directory card showing circuit numbers, room locations, and a blank column for "REMARKS".

.3 Wire and Cable Colour Coding:

.1 All power and systems wiring shall be colour coded as follows:

Power	Phase A	Red
	Phase B	Black
	Phase C	Blue
	Identified (Neutral)	White
	Ground	Bare or Green
Motor Control		Yellow

.2 Provide suitable clip-on or stick-on wire markers for all wires at points of termination and interconnection. Wire markers shall identify panel and circuit number in a clear and logical manner.

3 EXECUTION

3.1 INSTALLATION

.1 Lamicoid nameplates shall be mounted behind the panel door, fastened with contact cement.

.2 Temporary panel directory cards shall be provided and filled in as the circuits are installed. The temporary directory card shall be replaced with a typed permanent directory at job completion.

.3 The panel directory card shall be inserted in the card holder on the inside of the panel door and be protected by a clear plastic sheet.

.4 Feeder cables shall be colour coded in each terminal panel and junction box with a minimum 75 mm (3 in) taped band.

.5 All power and systems junction and terminal box covers shall be marked with permanent black marker as to system installed (i.e. "F.A." for Fire Alarm) and other details such as circuit numbers, detection zone, etc. Exposed boxes shall have marking on inside face of cover.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 Provide indoor distribution dry type transformers of the size and type as shown on the drawings and specified herein.

1.2 SUBMITTALS

.1 Provide detailed shop drawings showing equipment sizes, dimensions, nameplate data and all other pertinent details required to complete the installation and connections.

1.3 QUALITY ASSURANCE

.1 Dry type transformers shall be manufactured and tested in accordance with the latest issue of CSA Standard C-9 for the applicable rating.

.2 Dry type transformers sound level shall comply with the latest issue of NEMA Standard TR1.

.3 Dry-type transformers minimum efficiency values shall comply with CAN/CSA-C802.2-12.

.4 Power transformers maximum losses shall comply with CAN/CSA-C802.3-01 (R2012).

2 PRODUCTS

2.1 DRY TYPE TRANSFORMERS

.1 Indoor distribution transformers shall be two winding (not autotransformers), 60 cycle, high efficiency ANN dry type. Transformers shall be 3 phase two winding type designed for 600 V Delta primary and 120/208V Wye secondary system voltages unless otherwise indicated on the drawings. Transformer capacity ratings shall be as indicated on the drawings.

.2 Transformers shall be complete with four 2 1/2% full capacity taps, two full capacity above nominal (FCAN) and two full capacity below nominal (FCBN), and internal core/coil vibration mounts. Transformer enclosures shall be ventilated the Electrical Equipment Manufacturers Association of Canada (EEMAC) 1 type and be finished with light grey enamel. Provide sprinklerproof hoods for transformers installed in sprinklered areas and external neoprene vibration isolators.

.3 Transformer primary and secondary windings shall be [aluminum or copper].

.4 Transformer insulation shall be rated 220ºC, designed with a reduced 80ºC full load operating temperature rise to provide 29% overload capacity.

.5 Transformer insulation shall be 220ºC, designed with a reduced 115ºC full load operating temperature rise to provide 11% overload capacity.

.6 Transformer insulation shall be rated 220ºC (150ºC full load operating temperature rise).

2.2 SUPER ISOLATION TRANSFORMERS

.1 Indoor super isolation transformers shall be two winding, 60 cycle ANN dry type with Class 220 (150 Deg. C. rise) insulation rating. Transformers shall be 3 phase designed for 600 V Delta primary and 120/208 V Wye secondary system voltages unless otherwise indicated on the drawings. Transformer capacity ratings shall be as indicated on the drawings.

.2 Super isolation transformers shall be complete with four 2½% full capacity taps, two FCAN and two FCBN, and internal core/coil vibration mounts. Transformers shall be provided with EEMAC 1 ventilated enclosures and drip proof hoods finished in light grey enamel. Transformers shall be shielded with a simple configuration and no moving parts to provide fast response, output current limiting and complete isolation from the power supply line.

.3 Minimum super isolation transformer performance characteristics shall be as follows:

.1 Common Mode Rejection - 146 dB

.2 DC Isolation - 1000 megohms input and to output and circuit to ground

.3 Transverse Mode Rejection - typically 60 dB

.4 Operating Voltages - up to 110% of nominal

.5 Dielectric Strength - 2500 VAC minimum

.6 Frequency Input Range - 57-63 Hz

2.3 ELECTROSTATIC SHIELDED TRANSFORMERS

.1 Indoor electrostatic shielded transformers shall be two winding, 60 cycle ANN dry type with Class 220 (150 Deg. C. rise) insulation rating. Transformers shall be 3 phase designed for 600 V Delta primary and 120/208 V Wye secondary system voltages unless otherwise indicated on the drawings. Transformer capacity ratings shall be as indicated on the drawings.

.2 Electrostatic shielded transformers shall be complete with four 2½% full capacity taps, two FCAN and two FCBN, and internal core/coil vibration mounts. Transformers shall be provided with EEMAC 1 ventilated enclosures and drip proof hoods finished in light grey enamel. Transformers shall have a grounded copper electrostatic shield between the primary and secondary windings

.3 Minimum electrostatic shielded transformer performance characteristics shall be as follows:

.1 Common Mode Rejection - 60 dB

.2 Operating Voltages - up to 110% of nominal

.3 Frequency Input Range - 57-63 Hz

3 EXECUTION

3.1 INSTALLATION

.1 All floor mounted transformers shall be mounted on concrete housekeeping pads with external neoprene vibration pads or equivalent.

.2 Transformers shall have flexible conduit connections or equivalent on both the high and low voltage feeders.

.3 Wall mounted transformers shall be mounted on a structural angle iron frame suitably attached to the masonry walls, steel structure, etc., and be set on external neoprene vibration isolators or equivalent.

.4 Dry type transformers up to and including 45 KVA shall be wall mounted. Transformers over 45 KVA are to be floor mounted. Exceptions to the above shall be as noted on the drawings.

.5 Adjust primary voltage tap to achieve desired secondary system voltage as instructed on site by Project Manager. Provide grounding terminals and primary and secondary lugs to suit indicated feeder conductors.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 and Section 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide Wiring Devices, including but not limited to the following:

.1 Receptacles

.2 Coverplates

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 05 33 - Raceways and Boxes for Electrical Systems

1.3 REFERENCES

.1 Abbreviations and Acronyms:

.1 AFCI: Arc Fault Circuit Interrupter

.2 GFI/GFCI: Ground Fault Circuit Interrupter

.3 UPS: Uninterruptible Power Supply

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 26 05 00 Common Work Results for Electrical.

.2 Product Data:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

.1 Special devices not listed in the Schedule of Wiring Devices.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules, and Specification:

.1 Acceptable Manufacturers:

.1 Hubbell

.2 Legrand - Pass & Seymour

.3 Eaton - Arrow Hart

.4 Bryant

.5 Leviton

.2 Requests for substitutions shall be made in conformance with Section 26 05 00 Common Work Results for Electrical.

.3 Products listed here are based on products and part numbers manufactured by Hubbell and indicate a level of quality and technical specification and is not an endorsement of the manufacturer.

2.2 MATERIALS

.1 All wiring devices and will be white in colour unless noted otherwise. Device part numbers shown represent required component series and are not meant to be exact part number or identify colour. The following special colours will be used:

.1 Red – Standby, Emergency or Essential Power

.2 Orange – UPS Power

.3 Green – Controlled Circuit

.4 Blue – Surge Suppression

.5 Black – Special receptacle not in CSA 5-15R or 5-20R configurations

.6 If an outlet exhibits more than one of the above properties, then a clear permanently-mounted label will be placed above the device stating all the other functions or properties of this wiring device.

.2 Schedule of Wiring Devices

.1 Standard Devices

Description	**CSA/NEMA Configuration**	**Hubbell Part Number**
15 Ampere, 120 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole, double pole, 3-way, 4-way, locking, pilot light, etc.)	n/a	1200 Series
20 Ampere, 120 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole, double pole, 3-way, 4-way, locking, pilot light, etc.)	n/a	1220 Series
15 Ampere, 347 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole, 3-way, and 4-way)	n/a	18200 Series
20 Ampere, 347 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole and 3-way)	n/a	18220 Series
15 Ampere, 120 Volt, Duplex Receptacle (Series includes standard, tamper resistant, isolated ground, weather resistant, corrosion resistant, etc.)	5-15R	5262 Series
20 Ampere, 120 Volt, T-Slot, Duplex Receptacle (Series includes standard, tamper resistant, isolated ground, weather resistant, corrosion resistant, etc.)	5-20R	5362 Series
15 Ampere, 120 Volt, GFCI Duplex Receptacle	5-15R	GFRST15
20 Ampere, 120 Volt, T-Slot, GFCI Duplex Receptacle	5-20R	GFRST20
15 Ampere, 120 Volt, GFCI Weather Resistant Duplex Receptacle	5-15R	GFWRST15
20 Ampere, 120 Volt, T-Slot, GFCI Weather Resistant Duplex Receptacle	5-20R	GFWRST20
30 Ampere, 120/250 Volt, Dryer Receptacle, Black	14-30R	HBL9430A

Description	CSA/NEMA Configuration	Hubbell Part Number
50 Ampere, 120/250 Volt, Range Receptacle, Black	14-50R	HBL9450A
20 Ampere, 120 Volt, Locking Single Receptacle, Black	L5-20R	2310
20 Ampere, 250 Volt, Locking Single Receptacle, Black	L6-20R	2320

.2 Standard Devices for use in light duty environments:

Description	CSA/NEMA Configuration	Hubbell Part Number
15 Ampere, 120 Volt, Decorator Duplex Receptacle	5-15R	DR15
20 Ampere, 120 Volt, T-Slot, Decorator Duplex Receptacle	5-20R	DR20
15 Ampere, 120 Volt, Decorator Duplex Receptacle, Controlled, Green (Series includes controlled, half controlled, and tamper resistant)	5-15R	DR15C Series
20 Ampere, 120 Volt, T-Slot, Decorator Duplex Receptacle, Controlled, Green (Series includes controlled, half controlled, and tamper resistant)	5-20R	DR20C Series
15 Ampere, 120 Volt, Surge Protection Duplex Receptacle, Blue	5-15R	HBL5260SA
20 Ampere, 120 Volt, T-Slot, Surge Protection Duplex Receptacle, Blue	5-20R	HBL5360SA
15 Ampere, 120 Volt, Duplex Receptacle with 5 Ampere, 5 Volt combination USB Type A and Type C charging ports.	5-15R	USB15AC5
5 Ampere, 5 Volt, 4-port USB Type A charging ports.	n/a	USB4

.3 Coverplates

.1 Coverplates for wall mounted wiring devices in finished areas will be smooth 302 stainless steel type Where ganged devices have different colours, coverplate colour shall be white.

.2 Flush floor receptacles will be provided complete with a carpet flange to match floor box colour where applicable.

.3 In unfinished areas or surface mounted devices, coverplates will be galvanized type with rounded corners and back boxes will be cast type.

.4 Provide gasketed 'while-in-use' or extra duty polycarbonate cover Hubbell RW58300 for all devices exposed to weather or water splashing. Cover will have ability to install padlock to restrict access and removal of installed plugs.

.5 Provide proper ganged coverplates and backboxes for all grouped outlets. Provide internal barriers between receptacles from different panels, and between receptacles and extra low voltage outlets.

3 EXECUTION

3.1 INSTALLATION

.1 All switches controlling a connected load in excess of 10 amperes will be 20 ampere rated type.

.2 Mounting heights of the wiring devices will be as follows unless subject to special installation conditions, or otherwise indicated on floor plans or dimensioned interior elevations (Mounting heights refer to the centre of the outlet box):

.1 Light Switches and Control Devices 1100 mm (43").

.2 Wall Outlets and Receptacles 460 mm (18") or 150 mm (6") above countertop or back splash as applicable.

.3 In barrier-free spaces and suites, mount light switches and control devices at 1050 mm (41.5") above finished floor.

.3 Coverplates will be installed flush and level.

.4 Install wiring devices after wall construction and painting is complete.

.5 All wiring devices shown as being relocated on drawings will be replaced with new device and coverplate and will be connected to the existing circuit.

.6 Install all wall switches with the off position down. All CSA 5-15R and 5-20R configuration receptacles will be installed so the ground is in the bottom position.

.7 Where electrical outlets and wall mounted heating units occur at the same height and location, the outlets will be mounted below or beside the heater, unless noted otherwise.

.8 Work top mounted outlets will be above floor monument type securely fastened to Work surface using a threaded connection to conduit system. Provide all required fittings, inserts and accessories required for approved mounting and connection.

.9 Outlets installed in millwork will be standard wall mounted versions, flush mounted into face of the appropriate vertical surface. Refer to millwork elevations and sections for further details.

.10 Ensure that for receptacles marked as isolated ground that the bond wire is connected to the serving panels isolated ground bus.

.11 Receptacles not on isolated ground will have a green bond wire bonded to the device grounding terminal, the back box it is located in, and bonded to the branch circuit panelboard ground bus.

.12 Prior to rough-in for wall outlets for flat screen displays, coordinate mounting height such that flat screen mounting bracket is not interfering with wall outlet. Care should be taken to ensure wall outlet is completely behind flat screen display when mounted. If outlet is completely behind flat screen cover will not be installed.

.13 All outlets installed in exterior locations will be weather resistant type and will be protected with an extra duty or while-in-use cover for allowing outlet to be covered even while in use.

3.2 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 When installation is complete, test operation of all devices. All defective devices shall be replaced and all defective wiring shall be repaired.

.1 Switches should be operated to ensure load is switching as expected.

.2 For CSA 5-15R and 5-20R configuration receptacles should be tested with handheld plug-in receptacle tester for open circuits, and reversed wiring. Ground-fault circuit interrupter (GFCI) test shall be completed on all GFCI receptacles and circuits.

.3 For receptacles of other configurations, a multimeter shall be used to preform similar tests.

.2 Non-Conforming Work:

.1 Defective materials or quality of Work, whenever found, at any time prior to acceptance of the Work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.

.2 Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to the satisfaction of the Consultant at no additional cost to the Owner.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide electric heaters, including but not limited to the following:

.1 Slope Top Convector Heaters

.2 Baseboard heaters

.3 Force Flow Heaters

.4 Unit Heaters

.5 Enclosure Heaters

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA C22.2 No. 46 – Electric Air Heaters

1.4 SUBMITTALS

.1 Submittals under this section shall be in accordance with Section 01 33 00 - Submittals.

.2 Product Data:

.1 Submit manufacturer's product data sheets for products proposed for use in the Work of this section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

.2 Submit product data sheets for electric heaters, including accessories.

.3 Colour Chart: Submit the manufacturer’s standard colour chart.

.3 Test and Evaluation Reports:

.1 Start-Up Report: Submit a site start-up report from the manufacturer’s representative as specified in Part 3 of this Section.

1.5 CLOSEOUT SUBMITTALS

.1 Submittals under this Section shall be in conformance with Section 26 05 00.

.2 Warranty Documents:

.1 Shall be in conformance with Section 26 05 00.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules and Specification:

.1 Acceptable manufacturers are:

.1 Ouellet

.2 Chromalox

.3 Stelpro

.2 Requests for substitutions shall be made in conformance with 26 05 00.

.3 Single source responsibility: Obtain each type of product in this section from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

2.2 MATERIALS

.1 General:

.1 Electric heaters are to be certified and labelled in accordance with requirements of CSA C22.2 No. 46

.2 Electric heaters are to be complete with automatic reset high limit temperature control, baked epoxy/polyester powder coat finish, and in accordance with the drawing schedule.

.2 Sloped Top Convector Heaters:

.1 Wall mounted sloped top electric convector heaters, each complete with:

.1 Enclosure and finish: steel cabinet, approximately 75 mm (3 in) wide, 25 mm (10 in) high, with steel removable front panel with pencil-proof louvre grilles.

.2 Heating element: standard watt density 900 W/m (2950 W/ft), noise free, steel tubular element with aluminium fins, floating on high-temperature bushings.

.3 Integral thermostat: tamperproof, single pole, integral, factory installed thermostat, screwdriver adjustable and complete with "off" position.

.4 Enclosure accessories: factory supplied enclosure accessories as indicated on the floor plan drawings and/or heater schedule.

.5 Site control connection hardware: factory installed relay section with 24-volt relay and transformer for site connection to a remote thermostat.

.6 Site interlock connection hardware: factory installed contacts and hardware for site interlocking with air conditioning equipment as indicated on the drawings.

.3 Baseboard Heaters:

.1 Low profile wall mount baseboard heaters, each approximately 150 mm (6 in) high, 65 mm (2½ in) deep, complete with:

.1 Enclosure: steel body with steel connection box at both ends of the heater, two rows of mounting holes, single screw built-in wire holder, and steel removable front panel with rounded upper corners.

.2 Heating element: standard watt density 900 W/m (2950 W/ft) tubular steel heating element with aluminium fins, noise free and floating on high temperature bushings.

.3 Integral thermostat: factory installed, tamperproof, adjustable bi-metal thermostat.

.4 Enclosure accessories: factory supplied enclosure accessories as indicated on the floor plan drawings and/or heater schedule.

.5 Site control connection hardware: factory supplied control components as per the drawing schedule, with low voltage/line voltage barrier as required.

.6 Site interlock connection hardware: factory installed contacts and hardware for site interlocking with air conditioning equipment as indicated on the drawings.

.4 Forced Flow Heaters:

.1 Surface mounted or recessed cabinet heaters as shown, each complete with:

.1 Enclosure: steel cabinet and removable steel front panel with integral louvers and grille with rounded corners.

.2 Heating element: tubular steel heating element with aluminium fins

.3 Fan and motor: steel fan wheel, direct driven by means of a motor conforming to requirements of the mechanical Work section entitled Basic Mechanical Materials and Methods, and complete with a fan delay to purge the heater of residual heat.

.4 Integral thermostat: factory installed, tamperproof, adjustable thermostat.

.5 Enclosure accessories: factory supplied enclosure accessories as indicated on the floor plan drawings and/or heater schedule.

.6 Site control connection hardware: factory supplied control components as per the drawing schedule, with low voltage/line voltage barrier as required.

.5 Unit Heaters:

.1 Horizontal surface mounting unit heaters, each complete with:

.1 Enclosure: die-formed steel with individually adjustable discharge louvers, and mounting brackets for either ceiling or wall swivel mounting.

.2 Heating element: tubular steel heating element with fins.

.3 Fan and motor: resiliently mounted totally enclosed motor in accordance with requirements specified in the mechanical Work section entitled Basic Mechanical Materials and Methods, direct connected to a statically and dynamically balanced aluminium fan and complete with guard.

.6 Enclosure Heaters and Thermostats:

.1 Rittal Corp. (1-937-399-0500) Model SK 3105 120 volt or 240 volt, pre-wired, enclosed, CSA certified, continuous thermal output electric resistance heaters with fans, Model 3110.000 thermostats, snap type fastening rails, and all required mounting and connection accessories.

3 EXECUTION

3.1 INSTALLATION

.1 Room Electric Heaters:

.1 Install room electric heaters where shown, complete with all required accessories as indicated.

.2 Confirm exact locations prior to electrical rough-in.

.2 Enclosure Electric Heaters:

.1 Install enclosure heaters with fans and thermostats in fire hose cabinets where subject to freezing and as indicated.

.2 Install in strict accordance with the heater manufacturer’s printed instructions. Do all interconnection wiring within each cabinet.

.3 Set thermostats and test operation of each heater and fan.

3.2 SYSTEM STARTUP

.1 Perform all Equipment and System Start-up as per Section 26 05 00.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide disconnect switches.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 28 13 Fuses

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA – C22.2 No. 4 – Enclosed and Dead-Front Switches

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 01 33 00 - Submittals.

.2 Product Data:

.1 Submit manufacturer's Product data sheets for disconnect switches and accessories proposed for use in the Work of this section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the drawings, schedules, and Specification:

.1 Acceptable manufacturers are:

.1 Rockwell Automation/Allen-Bradley

.2 Eaton

.3 Siemens

.4 Schneider Electric

.2 Requests for substitutions shall be made in conformance with Section 26 05 00

.3 Single source responsibility: Obtain each type of product in this section from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

2.2 MATERIALS

.1 All disconnect switches are to be in accordance with requirements of CSA – C22.2 No. 4.

.2 Disconnect Switches:

.1 Heavy-duty front operated switches each in accordance with CSA – C22.2 No. 4, each complete with a red handle suitable for padlocking in the “off” position, and a NEMA/ EEMAC enclosure.

.2 Fusible units are to be complete with fuse clips in accordance with CSA-C22.2 No. 39, Fuseholder Assemblies and to suit fuse types specified below.

.3 Unless otherwise scheduled or specified fuses are to be equal to English Electric Ltd. HRC fuses, Form I Class “J” for constant running equipment and Form II Class “C” for equipment that cycles on and off.

.4 Provide viewing window that will allow visibility of the position of the blades.

.5 Enclosures: Unless otherwise specified, contactor enclosures are to be in accordance with the following NEMA/EEMAC ratings:

.1 All enclosures located in sprinklered areas – Type 2.

.2 All enclosures exposed to the elements – Type 3R, constructed of stainless steel.

.3 All enclosures inside the building in wet areas – Type 3R, constructed of stainless steel.

.4 All enclosures in washdown or food preparation areas - Type 12X, constructed of stainless steel.

.5 All enclosures in explosion rated area – Type 7 with exact requirements to suit the area and application.

.6 All enclosures except as noted above – Type 1.

3 EXECUTION

3.1 INSTALLATION

.1 Disconnect Switches:

.1 Install all required disconnect switches in accordance with drawing plans, schedules, details, and requirements of the Specification.

.2 Install fuses for fusible disconnects.

END OF SECTION

GENERAL DRAWING NOTES:

1. THESE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND ARE NOT TO BE SCALED. THIS TRADE MUST COORDINATE SCOPE OF WORK WITH ALL CONTRACT DRAWINGS AND COORDINATE INSTALLATIONS WITH MECHANICAL, ARCHITECTURAL SYSTEMS, AND OTHER TRADES TO AVOID CONFLICT AND DELAYS.
2. THE ELECTRICAL CONTRACTOR SHALL REVIEW ALL CONTRACT DRAWINGS AND VISIT THE SITE PRIOR TO SUBMITTING HIS BID TO VERIFY ALL INSTALLATIONS AND EXISTING FIELD CONDITIONS. SUBMISSION OF THE BID IS EVIDENCE THAT THIS TRADE THOROUGHLY UNDERSTANDS THE SCOPE OF THE WORK AND HAS INCLUDED ALL COSTS FOR THE COMPLETE SCOPE OF WORK FOR ALL OPERATING SYSTEMS IN THE BID, INCLUDING COORDINATION WITH OTHER TRADES, PRIOR TO ORDERING MATERIALS AND ROUGH-IN.
3. THESE DRAWINGS ARE TO BE CONSIDERED AN INTEGRAL PART OF THE SPECIFICATIONS WHICH ACCOMPANY THEM. ANY ITEM OR SUBJECT OMITTED FROM ONE BUT WHICH IS MENTIONED OR REASONABLY IMPLIED IN THE OTHER, OR AS REQUIRED BY CODE OR FOR A PROPERLY FUNCTIONING SYSTEM, SHALL NOT RELIEVE THIS TRADE OF ITS RESPONSIBILITY.
4. COORDINATE ALL WORK WITH OTHER TRADES FOR AVAILABLE SPACE, AVOID INTERFERENCES, SEQUENCE OF INSTALLATIONS AND INSTALLATION REQUIREMENTS PRIOR TO COMMENCING CONSTRUCTION. PLAN WORK WELL IN ADVANCE TO ELIMINATE INSTALLATION AND COORDINATION DIFFICULTIES.
5. COOPERATE WITH OTHER TRADES ON SITE TO RESOLVE INTERFERENCES TO SATISFACTORILY COMPLETE THE PROJECT. IMMEDIATELY NOTIFY THE CONSULTANT OF ANY CONFLICTS WHICH IMPACT THE DESIGN INTENT PRIOR TO INSTALLATION, UNDER NO CIRCUMSTANCES SHALL THE TRADE PROCEED IN UNCERTAINTY.
6. REFER TO SCOPE OF WORK FOUND IN SECTION 01 10 00 OF THE SPECIFICATIONS.

DISCONNECT AND REMOVAL OF MATERIALS AND EQUIPMENT:

1. ELECTRICAL CONTRACTOR SHALL DISCONNECT AND REMOVE AND/OR RELOCATE EXISTING CONDUIT, DUCTS, EQUIPMENT, ETC. WHERE REQUIRED OR NOTED ON THE DRAWINGS. REMOVE ALL REDUNDANT JUNCTION BOXES, CONDUIT, WIRING, ETC. BACK TO POINT OF ORIGIN AND RE-SUPPORT EXISTING CABLING, CONDUITS, ETC. AS REQUIRED FOR A NEAT AND COMPLETE INSTALLATION.
2. EXISTING INSTALLATIONS ARE SHOWN FOR GENERAL REFERENCE ONLY. THE ELECTRICAL CONTRACTOR SHALL INCLUDE ALL COSTS TO MODIFY AND/OR EXTEND NEW WORK AS REQUIRED TO MEET THE DESIGN INTENT. WHERE EXISTING INSTALLATIONS NOT SHOWN ARE UNCOVERED AND DETERMINED TO BE APPROPRIATELY SIZED AND IN GOOD CONDITION, ALTERNATE CONNECTIONS WILL BE ACCEPTABLE WITH PRIOR APPROVAL.
3. THE OWNER WILL DECIDE WHICH ITEMS OR EQUIPMENT THEY WISH TO RETAIN AS THEIR PROPERTY. ELECTRICAL CONTRACTOR SHALL CAREFULLY REMOVE THESE ITEMS INTACT AND HAND OVER TO THE OWNER'S REPRESENTATIVE. THIS CONTRACTOR SHALL REMOVE ALL OTHER MATERIAL FROM THE PREMISES.
4. ELECTRICAL CONTRACTOR SHALL REUSE EXISTING CONDUIT, DUCTS AND/OR EQUIPMENT AS NOTED HEREIN OR AS SHOWN ON THE DRAWINGS. EXTEND ALL CONDUIT AND WIRE AS REQUIRED TO RECONNECT RELOCATED EQUIPMENT.
5. IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO REVIEW ALL DRAWINGS AND VERIFYING ALL ON SITE CONDITIONS TO DETERMINE THE EXACT EXTENT OF WORK REQUIRED TO ACCOMMODATE THE INSTALLATION OF NEW MECHANICAL PIPING AND DUCTWORK. THIS CONTRACTOR SHALL RELOCATE ALL EXISTING CONDUITS, BOXES, LIGHTING FIXTURES AND WIRING TO SUIT AND ENSURE ACCESSIBILITY IS MAINTAINED UPON COMPLETION OF OTHER DISCIPLINES NEW INSTALLATIONS.
6. EXTENTS OF DEMOLITION SHOWN ARE APPROXIMATE. THIS TRADE SHALL BE RESPONSIBLE FOR ANY DEMOLITION REQUIRED SO AS TO MEET THE DESIGN INTENT. CUT, CAP, REMOVE ANY EXISTING INSTALLATIONS MADE OBSOLETE BY NEW WORK WHETHER OR NOT SHOWN. IT IS THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO VISIT THE SITE TO EVALUATE THE EXTENT OF DEMOLITION BEFORE SUBMITTING THEIR TENDERS. FAILURE TO DO SO WILL NOT RELIEVE THIS CONTRACTOR OF THIS RESPONSIBILITY.
7. ELECTRICAL CONTRACTOR TO ALLOW FOR ANY AND ALL ADDITIONAL CHARGES FOR RELOCATING, REMOVING OR DISCONNECTING SERVICES AND/OR DEVICES NOT SHOWN ON THE ELECTRICAL PLANS THAT MAY INTERFERE WITH THE SCOPE OF OTHER DISCIPLINES. THE GENERAL CONTRACTOR SHALL COORDINATE THIS WORK WITH THE ELECTRICAL CONTRACTOR.
8. ALL INSTALLATIONS NOT SHOWN SHALL REMAIN AS CURRENTLY INSTALLED UNLESS OTHERWISE NOTED.
9. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ON SITE ALL LOCATIONS AND SIZES OF ALL SERVICES & EQUIPMENT PRIOR TO THE COMMENCEMENT OF WORK.
10. MAINTAIN EXISTING BRANCH WIRING AND CABLES TO ALL EXISTING DEVICES TO REMAIN. ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT, WIRING, JUNCTION BOXES, ETC. AS REQUIRED TO MAINTAIN EXISTING SERVICES WITHIN NON-RENOVATED AREAS.
11. COORDINATE WITH OWNER ANY TEMPORARY SHUT-DOWNS OR DISRUPTIONS FOR ANY SERVICES TO OCCUPIED AREAS. SERVICE SHUTDOWN TIMING SHALL BE DICTATED BY OWNER REQUIREMENTS.
12. ELECTRICAL CONTRACTOR TO TAG ALL CABLES, CONDUITS, ETC TO REMAIN IN ALL AREAS WITH BRIGHT YELLOW TAPE AND ENSURE THESE SYSTEMS ARE NOT DISTURBED DURING CONSTRUCTION.
13. EXISTING CONDUIT MADE EMPTY BY THE REMOVAL OF EQUIPMENT MAY BE REUSED TO FEED NEW EQUIPMENT AND OR DEVICES. ALL CONDUIT AND WIRE NOT BEING REUSED SHALL BE REMOVED COMPLETELY BACK TO SOURCE WHERE PRACTICAL.
14. ALL OPENINGS THAT RESULT FROM THE REMOVAL OF EQUIPMENT, DEVICES AND/OR SERVICES SHALL BE INFILLED BY THE GENERAL CONTRACTOR. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ANY CUTTING AND PATCHING REQUIRED TO SUIT THE INSTALLATION OF ANY NEW EQUIPMENT. ALL PATCHING SHALL BE WITH NEW MATERIALS TO SUIT EXISTING AND NEW CONSTRUCTION TO THE SATISFACTION OF THE ENGINEER AND ARCHITECT. MAINTAIN EXISTING WALL AND FLOOR FIRE RATINGS WHEN PATCHING.
15. ELECTRICAL EQUIPMENT TO BE REMOVED MUST BE ISOLATED AND DISCONNECTED AT THE SOURCE PRIOR TO REMOVAL OPERATIONS. DURING ISOLATION AND DISCONNECTION PROCEDURES DANGER TAGS MUST BE USED TO IDENTIFY ANY FEEDERS OR EQUIPMENT REMAINING ENERGIZED TO ACCOMMODATE NEW CONSTRUCTION.
16. NOTIFY OWNER AND ENGINEER OF ANY DAMAGE OR NON-WORKING EQUIPMENT THAT IS INDICATED TO BE RE-USED OR RELOCATED PRIOR TO COMMENCING WORK.

GENERAL RENOVATION NOTES:

1. EXISTING ELECTRICAL EQUIPMENT NOT SHOWN SHALL REMAIN AS PRESENTLY INSTALLED, UNLESS OTHERWISE NOTED.
2. ALL DEVICES SHOWN ARE NEW UNLESS OTHERWISE NOTED.
3. DEVICES CIRCUITED FROM EXISTING PANEL MAY NOT REFLECT THE ACTUAL CIRCUIT NUMBERS BUT ARE SHOWN FOR CONFIGURATION ONLY. CONNECT TO EXISTING SPARE BREAKERS OR PROVIDE BREAKERS AS REQUIRED TO SUIT LOADS.
4. REVISE PANEL DIRECTORIES TO SUIT CHANGES (TYPED).
5. WHEN UTILIZING EXISTING BRANCH CIRCUIT, PROVIDE NEW BRANCH CIRCUIT WIRING AS REQUIRED MEETING THE ONTARIO ELECTRICAL SAFETY CODE LATEST EDITION REQUIREMENTS.
6. EXISTING CONDUIT MADE EMPTY BY THE REMOVAL OF EQUIPMENT MAY BE REUSED TO FEED NEW EQUIPMENT AND OR DEVICES. EXTEND EXISTING CONDUIT TO PANEL AND DEVICES WHERE EVER POSSIBLE.
7. SCAN FLOOR SLABS AND SUBMIT RESULTS TO CONSULTANT FOR REVIEW AND APPROVAL, COMPLETE WITH PROPOSED LOCATIONS OF NEW PENETRATIONS, PRIOR TO ANY CUTTING.
8. ELECTRICAL CONTRACTOR TO PROVIDE SEPARATE NEUTRALS TO ALL CIRCUITS.

GENERAL POWER NOTES:

1. MAINTAIN MIN. 3'-4" (1000mm) CLEARANCE FROM ALL ELECTRICAL DISTRIBUTION EQUIPMENT.
2. ALL NEW CONDUIT INSTALLATION TO BE INSTALLED TIGHT TO THE CEILING DECK, ABOVE MECHANICAL DUCTS, IN ORDER NOT TO DETER INSTALLATION OF LIGHTING FIXTURES AND DIFFUSERS.
3. ALL PANELS SHALL BE COMPLETE WITH PANEL DOORS, AND LOCKS KEYED ALIKE. AT THE END OF THE PROJECT, PROVIDE PANEL KEYS TO OWNER.
4. UNLESS OTHERWISE NOTED, ALL NEW DEVICES AND FACEPLATES SUPPLIED IN OFFICE AREA SHALL BE <WHITE> <DECORA> WITH MATCHING COVER PLATE. IN SHOP AREAS, NEW DEVICES SHALL BE <WHITE> WITH STAINLESS STEEL COVER PLATE. ALL OUTLETS SHALL BE FLUSH MOUNTED IN WALL UNLESS OTHERWISE NOTED.
5. ALL WIRING TO BE CODED WITH SHRINK WRAP TAPE SHOWING CIRCUITS ON ALL HOT AND NEUTRAL WIRING AT PANEL, OUTLETS AND ANY JUNCTION OR PULL BOXES (TYP. FOR ALL POWER, LIGHTING, OR MECHANICAL SYSTEMS)
6. WHERE CONDUITS PASS THROUGH FLOORS AND FIRE RATED WALL, SEAL SPACE BETWEEN CONDUIT AND STRUCTURE. PROVIDE FIRE BARRIER AROUND ALL COMPONENTS IN HOLES WHICH PENETRATE FIRE SEPARATIONS. THE FIRE BARRIER MEDIUM PROVIDED SHALL MAKE THE FIRE SEPARATION EQUAL TO OR BETTER THAN ONE WHICH HAS CUT AWAY.
7. WHEREVER CORE HOLES ARE REQUIRED THROUGH SLAB, ELECTRICAL CONTRACTOR TO PROVIDE A MINIMUM OF 1-2" SLEEVE FOR FUTURE AS SPARE.
8. PROVIDE 4-4" SPARE SLEEVES TO BE PROVIDED THRU ALL FIRE SEPARATIONS, BLOCK OR CONCRETE WALLS.
9. ELECTRICAL CONTRACTOR TO ALLOW FOR <TWO (2)> ADDITIONAL 120V CIRCUITS FOR MECHANICAL CONTROLS CONNECTIONS TO BE COORDINATED DURING CONSTRUCTION OR NEW WORK.
10. ALL CONDUITS AND CABLING TO RUN ABOVE CEILING.
11. ALL POWER PULL BOXES TO BE 18"x18"x6" MINIMUM. PROVIDE LAMICOID CIRCUIT DESCRIPTOR ON OUTSIDE OF COVER AND COLOUR CODE PAINT THE COMPLETE COVER, TYPICAL.
12. ELECTRICAL CONTRACTOR TO ALLOW FOR A MINIMUM OF <10> x 15A-1P CIRCUITS C/W A MINIMUM OF 50' OF CONDUIT AND WIRE FROM EACH PANEL TO ALLOW FOR UNFORESEEN CONNECTIONS DURING CONSTRUCTION.

POWER DEMOLITION NOTES:

1. ALL EXISTING DEVICES IN AREA OF RENOVATIONS TO REMAIN AS EXISTING UNLESS OTHERWISE NOTED.
2. ALL EXISTING DEVICES IN AREA OF RENOVATIONS TO BE DISCONNECTED AND REMOVED UNLESS OTHERWISE NOTED.
3. REMOVE AND MAKE SAFE EXISTING RECEPTACLES AND DEVICES AS WELL AS CONDUIT AND BRANCH CIRCUIT WIRING FEEDING DEVICES NOTED TO BE REMOVED.
4. EXISTING DEVICES TO REMAIN SHALL BE RECIRCUITED AS NOTED ON NEW PANEL SCHEDULES AND PLANS.
5. DEVICES AND EQUIPMENT IN ELECTRICAL ROOM TO REMAIN AS INSTALLED UNLESS OTHERWISE NOTED.
6. EXISTING CONDUIT BELOW SLAB FEEDING DEVICES AND EQUIPMENT NOTED AS EXISTING TO BE REMOVED SHALL BE CUT BACK BELOW SLAB AND ABANDONED. REMOVE EXISTING BRANCH WIRING COMPLETELY BACK TO SOURCE UNLESS OTHERWISE NOTED. REWORK EXISTING CIRCUITS AS REQUIRED OR AS INDICATED ON NEW PLANS.
7. ELECTRICAL CONTRACTOR TO ALLOW FOR THE RELOCATION/REPLACEMENT OF UP TO 5 ELECTRICAL FEEDERS UP TO 3/0 IN SIZE TO ALLOW FOR INSTALL OF NEW MECHANICAL SYSTEMS. ALLOW FOR 200'-0" OF CONDUIT, WIRE AND LABOR FOR EACH SERVICE AS REQUIRED.

POWER RENOVATION NOTES:

1. CONNECT NEW DEVICES IN AREAS NOTED ON PLANS TO EXISTING BRANCH CIRCUITS IN THEIR RESPECTIVE AREAS.
2. DEVICES AND EQUIPMENT IN ELECTRICAL ROOM TO REMAIN AS INSTALLED UNLESS OTHERWISE NOTED.
3. NEW OR ADDITIONAL ELECTRICAL PANELBOARDS SHALL MATCH EXISTING LANDLORDS DISTRIBUTION EQUIPMENT MANUFACTURER. BOLT-ON BREAKERS C/W TYPE WRITTEN DIRECTORY (HAND WRITTEN DIRECTORIES WILL NOT BE ACCEPTED). ALTERNATE MANUFACTURERS ARE NOT ACCEPTABLE.
4. ELECTRICAL CONTRACTOR TO ENSURE THAT AREAS OUTSIDE OF RENOVATED SCOPE REMAIN AS EXISTING. ALLOW FOR CONDUIT, WIRE AND LABOUR AS REQUIRED TO ENSURE SYSTEMS REMAIN IN OPERATION.
5. ALLOW FOR REVISIONS TO EXISTING SERVICES WHERE NEW SERVICES MEET EXISTING. ENSURE EXISTING SERVICES ARE RE-ROUTED AS REQUIRED TO ALLOW FOR A COMPLETE OPERATING SYSTEM.

ELECTRICAL DRAWING LIST

ELECTRICAL LEGEND

POWER	
	DIRECT CONNECTION
	ELECTRIC HEATERS BASEBOARD, CABINET HEATER, CEILING HEATER, UNIT HEATER (REFER TO ELECTRICAL HEATER SCHEDULE FOR MORE INFORMATION)
	PANELBOARD SURFACE MOUNT, FLUSH MOUNT
	TRANSFORMER
	DISCONNECT SWITCH (SIZE AS NOTED) NON-FUSIBLE, FUSIBLE
EXXX	EQUIPMENT TAG **E**LECTRICAL, **F**IRE ALARM, **H**EATER, **C**AMERA, **D**ATA, **M**ECHANICAL, **K**ITCHEN, **L**ABORATORY, **O**WNER
MECHANICAL	
	MOTOR
SMC VFD	STARTERS MANUAL, MAGNETIC, COMBINATION, SOLID STATE, VARIABLE FREQUENCY DRIVE (VFD)
RENOVATION	
EX	EXISTING DEVICE TO REMAIN AS PRESENTLY INSTALLED
OR	DISCONNECT AND REMOVE EXISTING DEVICE COMPLETELY
REL	DISCONNECT AND REMOVE EXISTING DEVICE FOR RELOCATION
REL	EXISTING DEVICE IN RELOCATED POSITION AND RECONNECTED AS PREVIOUS UNLESS NOTED OTHERWISE

ABBREVIATIONS

CM	=	CEILING MOUNTED
WM	=	WALL MOUNTED
FM	=	FLOOR MOUNTED
AFF	=	ABOVE FINISHED FLOOR
AFG	=	ABOVE FINISHED GRADE
BFG	=	BELOW FINISHED GRADE
BFC	=	BELOW FINISHED CEILING
WP	=	WEATHERPROOF
LSIG	=	LONG, SHORT, INSTANTANEOUS, GROUND-FAULT TRIP SETTINGS
AWG	=	AMERICAN WIRE GAUGE
NO/NC	=	NORMALLY OPEN / NORMALLY CLOSED
U/G	=	UNDERGROUND
O/H	=	OVERHEAD
ATS	=	AUTOMATIC TRANSFER SWITCH
MTS	=	MANUAL TRANSFER SWITCH
CT/PT	=	CURRENT TRANSFORMER / POTENTIAL TRANSFORMER

SINGLE LINE LEGEND

LINE TYPES	
EX	EXISTING TO REMAIN
DR	DISCONNECT AND REMOVE
REL	DISCONNECT AND REMOVE FOR RELOCATION
REL	EXISTING IN RELOCATED POSITION
	NEW
	CONTROL WIRE
	LEVEL BOUNDARIES
	ROOM/AREA BOUNDARIES
XXX	FEEDER SIZE - REFER TO FEEDER SCHEDULE
EQUIPMENT	
	DRAW OUT / FIXED CIRCUIT BREAKER
	NON-FUSIBLE / FUSIBLE DISCONNECT SWITCH
	TRANSFORMER △ = DELTA (3 WIRE + GROUND) Y = WYE (4 WIRE + GROUND)
	ELECTRICAL PANEL - TAG INDICATES DESIGNATION REFER TO PANEL SCHEDULES FOR DETAILS

No.	ISSUANCE	DATE
1	ISSUED FOR 90% OWNER'S REVIEW	2024.03.06
2	ISSUED FOR PERMIT	2024.03.25
3	ISSUED FOR OWNER'S REVIEW	2024.04.19
4	ISSUED FOR BID	2024.07.26

Hamilton

CLIENT

CITY OF HAMILTON

PROJECT

C13-21-24: Supply and install a Domestic Hot Water (DHW) Solar Thermal and Unit Heaters Upgrade

TITLE

ELECTRICAL NOTES, LEGENDS, AND DRAWING LIST

WALTERFEDY

TORONTO | CALGARY | **KITCHENER** | HAMILTON

800.685.1378 **walterfedy.com**

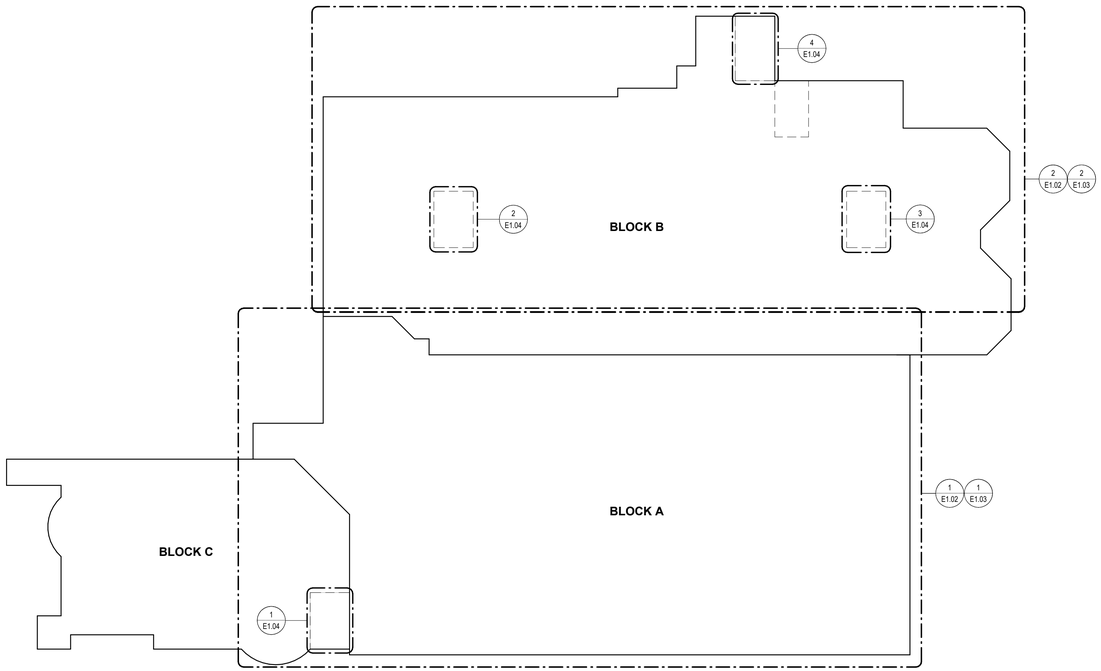
SEAL

LICENSED PROFESSIONAL ENGINEER
2024-08-08
P. GILJANOVIC
100123613
PROVINCE OF ONTARIO

SCALE :	N.T.S.
DATE :	2024.07.26
PROJECT NO :	2023-0524-10
DRAWN BY :	S.P.
CHECKED BY :	S.F.

SHEET NO :

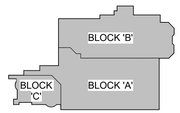
E0.01



1 E1.01 OVERALL POWER PLAN

Scale: N.T.S.

KEYPLAN



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ELECTRICAL OVERALL PLAN

WALTERFEDY

TORONTO | CALGARY | **KITCHENER** | HAMILTON

800.685.1378 **walterfedy.com**

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2024-08-08
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100122613
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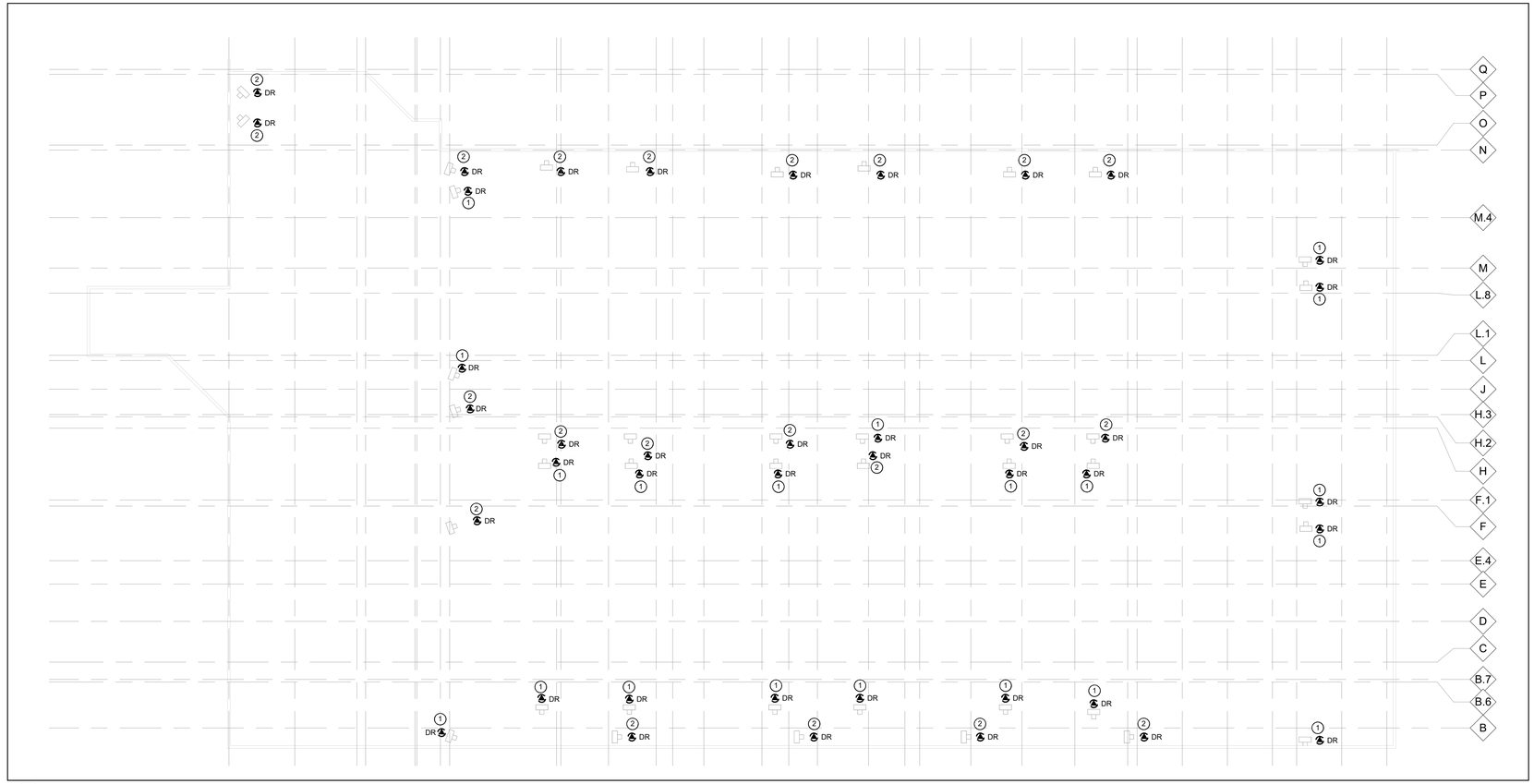
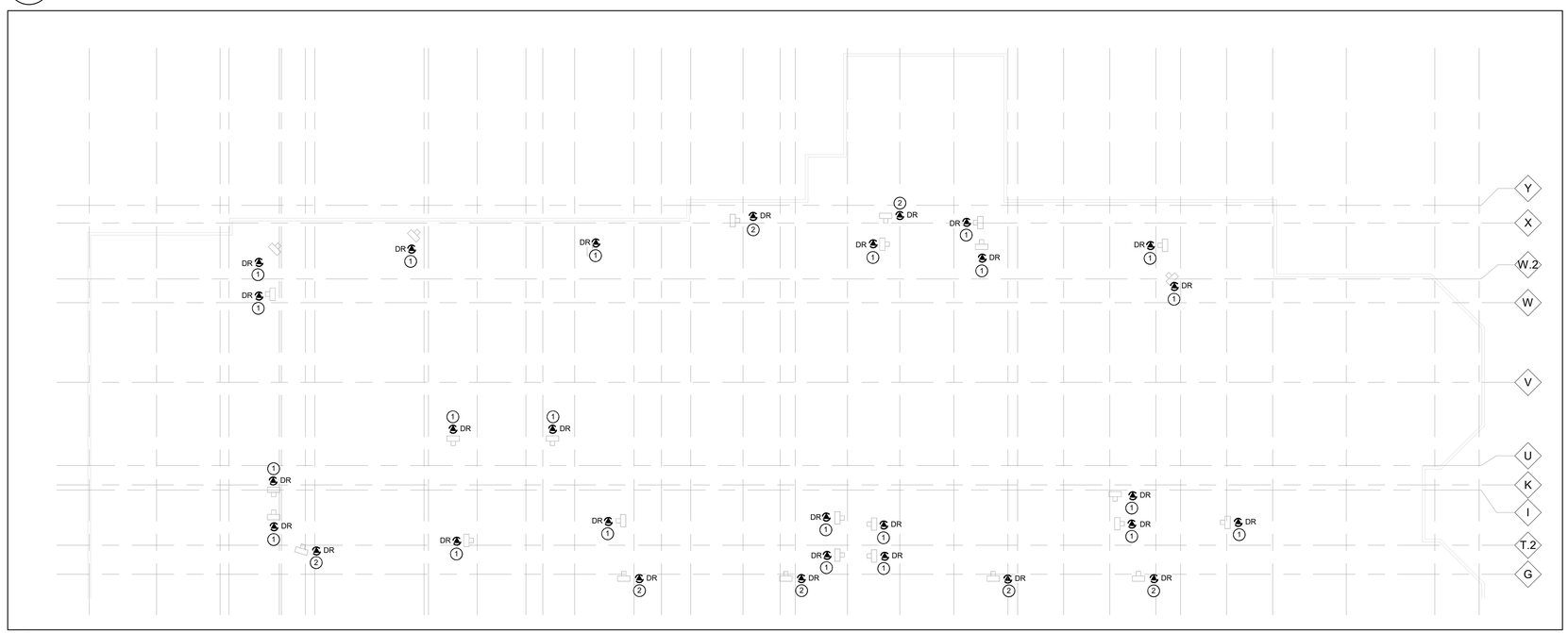


1 E1.02 POWER & SYSTEMS DEMOLITION LAYOUT - BLOCK A

Scale: 1 : 350



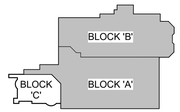
2 E1.02 POWER & SYSTEMS DEMOLITION LAYOUT - BLOCK B

Scale: 1 : 300

DRAWING NOTES

1. DISCONNECT AND REMOVE CONDUIT TO NEAREST JUNCTION BOX, AND REMOVE BRANCH CIRCUIT AND ALL ASSOCIATED EQUIPMENT BACK TO SOURCE AND MAKE SAFE. LABEL BREAKER AS SPARE.
2. MAINTAIN EXISTING CIRCUIT FOR NEW EQUIPMENT AND DEMOLISH ALL OTHER ASSOCIATED EQUIPMENT FOR INDICATED EQUIPMENT.

KEYPLAN



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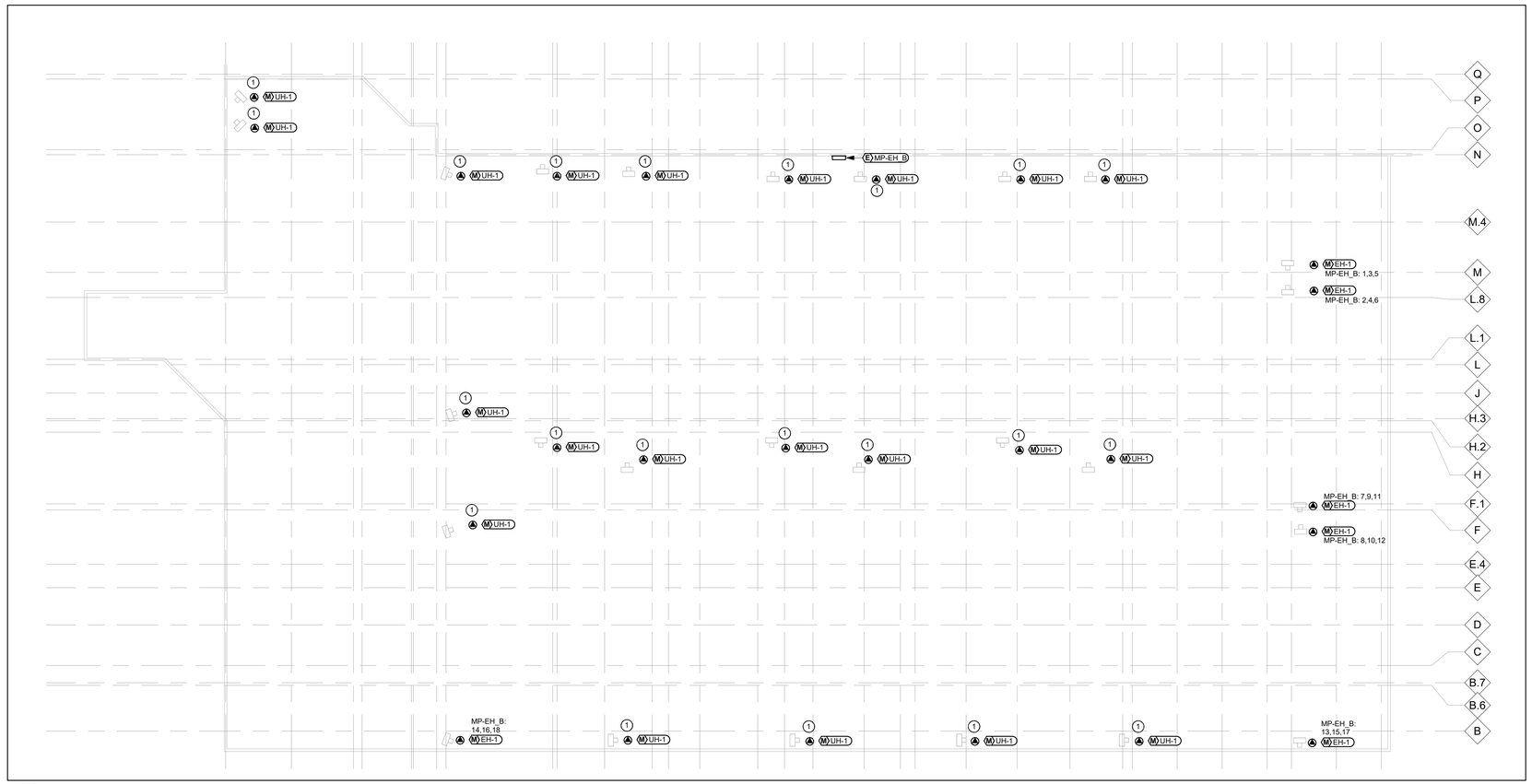
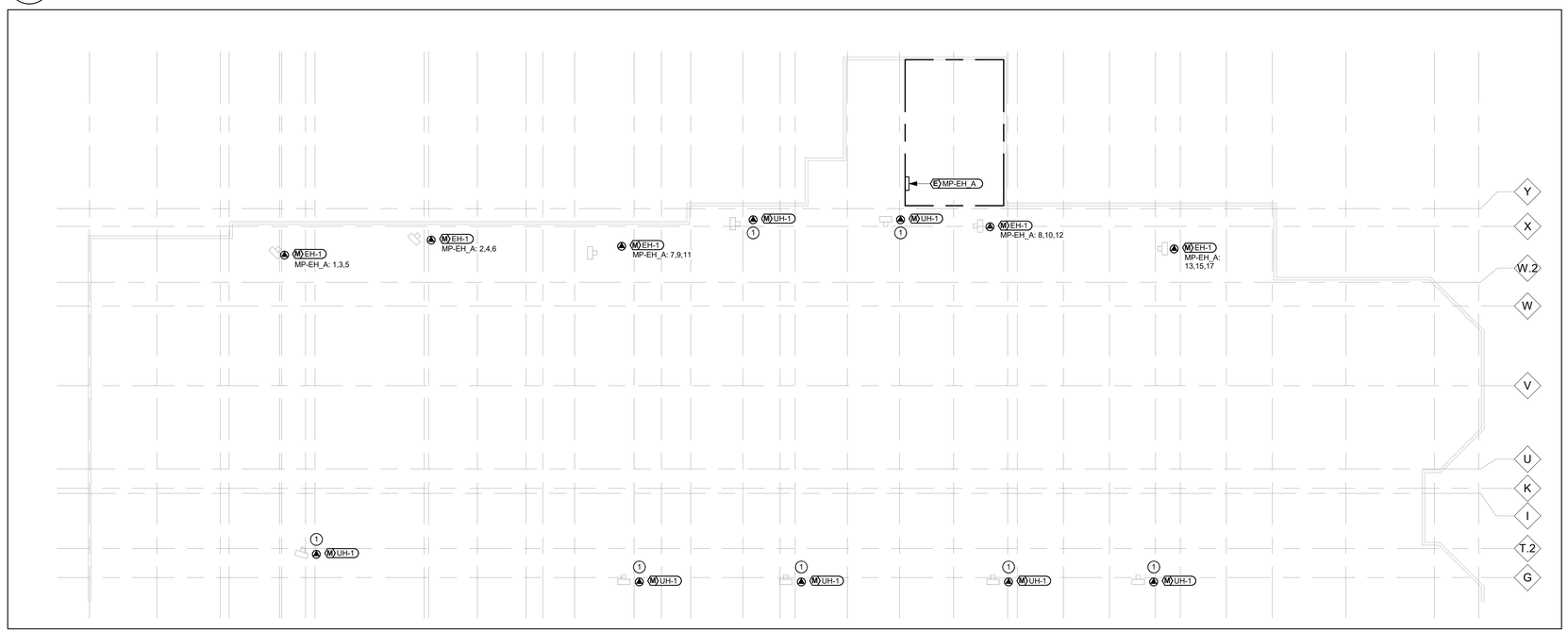
SEAL

SCALE :	AS NOTED	SHEET NO :
DATE :	2024.07.26	**E1.02**
PROJECT NO :	2023-0524-10	
DRAWN BY :	S.P.	
CHECKED BY :	S.F.	



1 E1.03 POWER & SYSTEMS LAYOUT - BLOCK A

Scale: 1 : 350



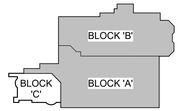
2 E1.03 POWER & SYSTEMS LAYOUT - BLOCK B

Scale: 1 : 300

DRAWING NOTES

1. RE-WORK EXISTING FEED MADE SPARE IN DEMOLISHED TO POWER INDICATED EQUIPMENT.

KEYPLAN



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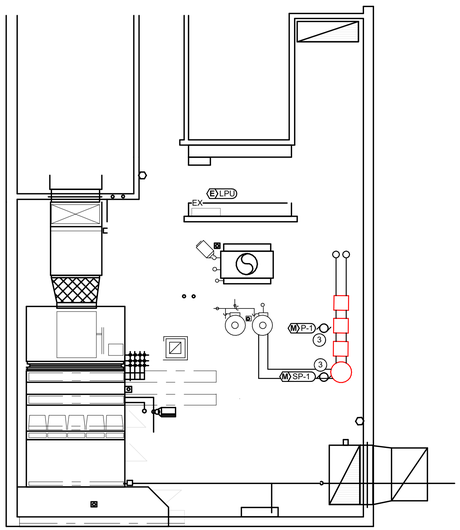
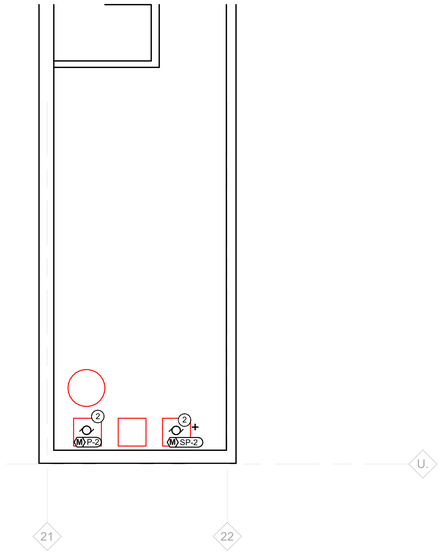
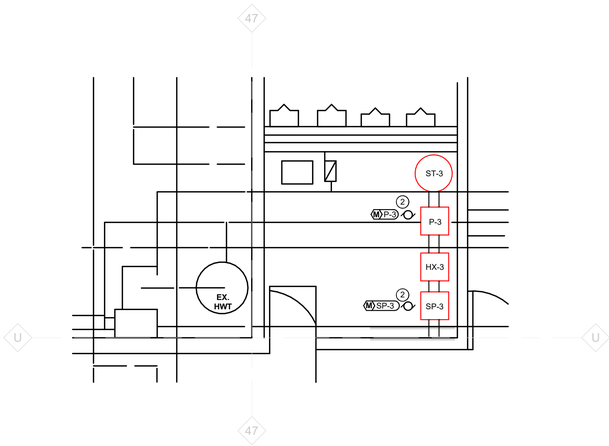


1 E1.04 BLOCK 'C' MECHANICAL ROOM LOWER MODIFICATION PLAN
Scale: 1 : 50



2 E1.04 MEZZANINE 260 - PLUMB. & DRAIN. MOD. PLAN
Scale: 1 : 50



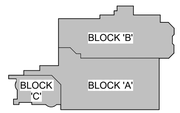
3 E1.04 MAINT. & REPAIR UPPER LEVEL PLBG -PLUMB. & DRAIN. MOD. PLAN
Scale: 1 : 50

4 E1.04 ELECTRICAL ROOM - PROPOSED PANEL LOCATION
Scale: N.T.S.

DRAWING NOTES

1. APPROXIMATE LOCATION OF NEW PANEL MP-EH_A.
2. FEED INDICATED MECHANICAL EQUIPMENT FROM 15A-1P BREAKER IN LOCAL 120V/208V PANEL MADE SPARE IN UNIT HEATER DEMOLITION.
3. FEED INDICATED MECHANICAL EQUIPMENT FROM NEW 15A-1P BREAKER ON PANEL LPU.

KEYPLAN



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TITLE
POWER AND SYSTEMS LAYOUT

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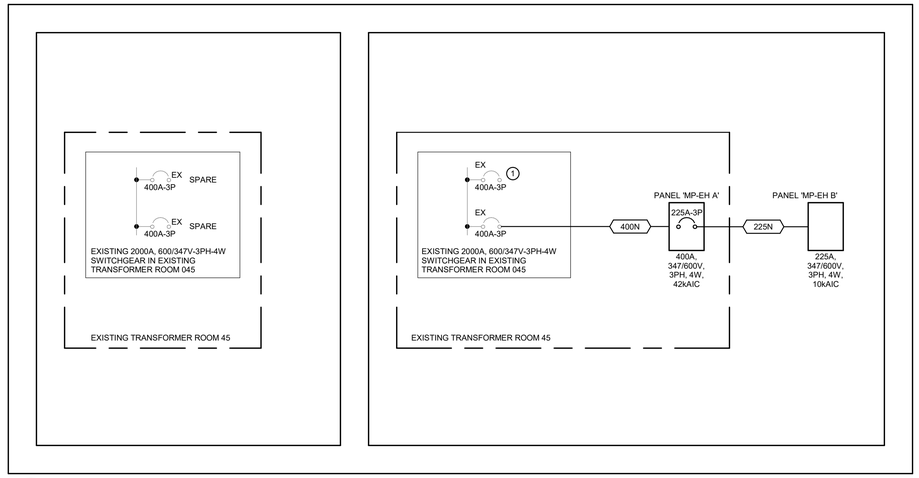
CHECKED BY :	S.F.

SHEET NO :
E1.04



1 SINGLE LINE DIAGRAM
E5.01 Scale: N.T.S.

FEEDER SCHEDULE

TAG	ALLOWABLE AMPACITY	RUNS	PHASE CONDUCTORS	IDENTIFIED (NEUTRAL) CONDUCTOR	BOND	CONDUIT SIZE mm	CONDUIT SIZE in
225N	230	1	3-4/0 AWG	4/0 AWG	4 AWG	63*	2-1/2*
400N	400	2	3-3/0 AWG	3/0 AWG	6 AWG	63	2-1/2

FEEDER SCHEDULE NOTES:

1. FEEDER SCHEDULE SYMBOLS OMITTING THE 'N' SHALL NOT INCLUDE THE IDENTIFIED (NEUTRAL) CONDUCTOR. CONDUITS SHOWN WITH * MAY REDUCE ONE NOMINAL SIZE WHEN OMITTING THE IDENTIFIED CONDUCTOR.
2. FEEDER SCHEDULE SYMBOLS PRE-FIXED WITH THE 'A' CHARACTER SHALL BE ALUMINIUM CONDUCTORS.
3. ALL CONDUCTORS SHALL BE COPPER CABLES UNLESS OTHERWISE NOTED.

DRAWING NOTES

(1) ADDITIONAL SPARE 400A-3P BREAKER USED IN FUTURE EV PROJECT

WIRING FOR MECHANICAL EQUIPMENT SCHEDULE

EQUIPMENT TAG	EQUIPMENT DESCRIPTION	LOCATION NAME	LOCATION NO.	ELECTRICAL VOLTAGE	ELECTRICAL PHASE	ELECTRICAL LOAD	ELECTRICAL WATTAGE	STARTER TYPE	STARTER LOCATION	CONTROL LOCAL	CONTROL ELECTRICAL	CONTROL MECHANICAL	CONTROL COMMUNICATION	INTERLOCK TO	INTERLOCK BY	MCC	MAINTENANCE REC	INTREGRAL LTG	F/A SHUTDOWN	REMARKS
EH-1	ELECTRIC UNIT HEATER			600 V	3	50A	40.00 kW	INT		TST										
P-1	PUMP			120 V	1	2.3A	0.27 kW	INT		HOA										
P-2	PUMP			120 V	1	2.3A	0.27 kW	INT		HOA										
P-3	PUMP			120 V	1	2.3A	0.27 kW	INT		HOA										
SP-1	PUMP			120 V	1	1.5A	0.20 kW	INT		HOA										
SP-2	PUMP			120 V	1	1.5A	0.20 kW	INT		HOA										
SP-3	PUMP			120 V	1	1.5A	0.20 kW	INT		HOA										
UH-1	UNIT HEATER			120 V	1	8.1A	0.20 kW	INT		TST										

WIRING FOR MECHANICAL EQUIPMENT SCHEDULE NOTES:

1. PROVIDE CONTROL VOLTAGE FROM A PROPER FUSED CONTROL CIRCUIT TRANSFORMER MOUNTED INTEGRALLY WITHIN THE CORRESPONDING DEVICE/STARTER.
2. PROVIDE 'SPRING RETURN' TO OFF (0) FROM HAND (H) POSITION FOR SUPERVISED TEST PURPOSES ONLY.
3. ON/OFF CONTROL SWITCH SHALL BE MOTOR RATED FOR LOAD.
4. INTEGRATE WITHIN CONTROL DEVICE ENCLOSURE ALL STATUS CONTACTS FOR ALARM AND DEVICE STATE, ETC.
5. INCLUDE THE FOLLOWING WITH ALL VARIABLE FREQUENCY DRIVES (VFD): ENCLOSURE APPROPRIATE FOR ENVIRONMENT, START/STOP PUSHBUTTON, HAND-OFF-AUTO, CONTROL SWITCH, DOOR MOUNTED HMI, DOOR MOUNTED DISCONNECT SWITCH, MANUALLY OPERATED VFD BYPASS, AUTOMATIC DRIVE BYPASS (FULL SPEED), LINE AND LOAD REACTORS, AND GROUND FAULT SENSING ALARM/TRIP. REFER TO SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
6. RATE ALL MECHANICAL EQUIPMENT FEEDERS TO MATCH THE OVERCURRENT PROTECTION DEVICE SPECIFIED.
7. ELECTRICAL CONTRACTOR TO TERMINATE WIRING FOR I/O (AS NOTED) AT THE LOCAL BAS PANEL COMPLETE WITH SLACK CABLE FOR CONNECTION BY MECHANICAL CONTROLS CONTRACTOR.
8. PROVIDE SUITABLE NORMALLY CLOSED (ENERGIZED) RELAY IN A NEMA RATED ENCLOSURE TO OPEN ON FIRE ALARM SIGNAL, MOUNT IN EQUIPMENT HOUSING AS DIRECTED BY CONTROLS CONTRACTOR.
9. PROVIDE LED PILOT LIGHTS IN FRONT FACE OF ALL CONTROL DEVICES AS FOLLOWS:
   a. GREEN-RUNNING
   b. RED-FAILED/FAULT
   c. AMBER-MANUAL
   - ABSENCE OF ANY ILLUMINATED LIGHT INDICATES MOTOR IS OFF AND/OR AVAILABLE FOR USE.
10. PROVIDE ALL FANS AND MOTORS WITH LOCAL ISOLATION SWITCH (EVEN IF NOT SHOWN ON DRAWINGS).
11. LOOSE STARTERS SHALL BE SUPPLIED AND INSTALLED BY MECHANICAL CONTRACTOR, WIRED BY ELECTRICAL CONTRACTOR.
12. LOCAL REMOTE CONTROL SHALL BE PROVIDED INTEGRAL WITH THE STARTER.
13. ELECTRICAL REMOTE CONTROL SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR AT A REMOTE LOCATION.
14. MECHANICAL REMOTE CONTROL SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR AT A REMOTE LOCATION.

STARTER TYPES:
MAN - MANUAL
MAG - MAGNETIC
CON - CONTACTOR
VFD - VARIABLE FREQUENCY DRIVE
CMB - COMBINATION
SFT - SOFT STARTER
SSS - SOLID STATE STARTER
2SP - TWO SPEED STARTER
RVS - REDUCED VOLTAGE STARTER
REV - REVERSING STARTER
INT - INTEGRAL
LOS - LOOSE

LOCAL CONTROL TYPES:
HLS - HIGH LOW SELECTOR
HOA - HAND-OFF-AUTO
OOS - ON-OFF SELECTOR
SSP - START-STOP PUSHBUTTONS
HMI - HUMAN MACHINE INTERFACE

ELECTRICAL REMOTE CONTROL TYPES:
TST - THERMOSTAT
OOS - ON-OFF SELECTOR
SSP - START-STOP PUSHBUTTON
TCK - TIME CLOCK
REL - CONTROL RELAY

MECHANICAL REMOTE CONTROL TYPES:
TST - THERMOSTAT
BAS - BUILDING AUTOMATION SYSTEM
CP - CONTROL PANEL
FST - FIRESTAT
AQT - AQUASTAT

COMMUNICATION/MONITOR TYPES:
BAS - BUILDING AUTOMATION SYSTEM
IP - ETHERNET
MOD - MODBUS

STARTER LOCATION TYPES:
INT - INTEGRAL
REM - REMOTE
MCC - MOTOR CONTROL CENTRE

Branch Panel: MP-EH_A — NEW/EXISTING

Location:
Supply From:
Mounting: RECESSED
Enclosure: NEMA 2
Manufacturer:
Model:

Volts: 600/347 Wye
Phases: 3
Wires: 4

A.I.C. Rating:
Mains Type: MLO
Mains Rating: 400 A
MCB Rating: 400 A
Bus Material: COPPER

Notes:

CCT	Circuit Description	Trip	Poles	A (kW)	B (kW)	C (kW)	Poles	Trip	Circuit Description	CCT
1	ELECTRIC UNIT HEATER - BLOCK 'B'	50 A	3	13.33	13.33		3	50 A	ELECTRIC UNIT HEATER - BLOCK 'B'	2
3	--	--	--		13.33	13.33	--	--	--	4
5	--	--	--			13.33	--	--	--	6
7	ELECTRIC UNIT HEATER - BLOCK 'B'	50 A	3	13.33	13.33		3	50 A	ELECTRIC UNIT HEATER - BLOCK 'B'	8
9	--	--	--		13.33	13.33	--	--	--	10
11	--	--	--			13.33	--	--	--	12
13	ELECTRIC UNIT HEATER - BLOCK 'B'	50 A	3	13.33						14
15	--	--	--		13.33					16
17	--	--	--			13.33				18
19										20
21										22
23										24
25										26
27										28
29										30
	Total Load:			66.667 kW	66.667 kW	66.667 kW				
	Total Amps:			192 A	192 A	192 A				

Legend:
ALL BREAKERS SHALL BE NEW UNLESS OTHERWISE NOTED
+ - BREAKER MADE AVAILABLE BY DEMOLITION
^ - EXISTING BREAKER
M - METER
ST - SHUNT TRIP
GFCI - GROUND FAULT CIRCUIT INTERUPT
AFCI - ARC FAULT CIRCUIT INTERUPT
AUX - AUXILIARY CONTACT

Branch Panel: MP-EH_B — NEW/EXISTING

Location:
Supply From:
Mounting: RECESSED
Enclosure: NEMA 2
Manufacturer:
Model:

Volts: 600/347 Wye
Phases: 3
Wires: 4

A.I.C. Rating:
Mains Type: MLO
Mains Rating: 225 A
MCB Rating: 225 A
Bus Material: COPPER

Notes:

CCT	Circuit Description	Trip	Poles	A (kW)	B (kW)	C (kW)	Poles	Trip	Circuit Description	CCT
1	ELECTRIC UNIT HEATER - BLOCK 'A'	50 A	3	13.33	13.33		3	50 A	ELECTRIC UNIT HEATER - BLOCK 'A'	2
3	--	--	--		13.33	13.33	--	--	--	4
5	--	--	--			13.33	--	--	--	6
7	ELECTRIC UNIT HEATER - BLOCK 'A'	50 A	3	13.33	13.33		3	50 A	ELECTRIC UNIT HEATER - BLOCK 'A'	8
9	--	--	--		13.33	13.33	--	--	--	10
11	--	--	--			13.33	--	--	--	12
13	ELECTRIC UNIT HEATER - BLOCK 'A'	50 A	3	13.33	13.33		3	50 A	ELECTRIC UNIT HEATER - BLOCK 'A'	14
15	--	--	--		13.33	13.33	--	--	--	16
17	--	--	--			13.33	--	--	--	18
19										20
21										22
23										24
25										26
27										28
29										30
	Total Load:			80 kW	80 kW	80 kW				
	Total Amps:			231 A	231 A	231 A				

Legend:
ALL BREAKERS SHALL BE NEW UNLESS OTHERWISE NOTED
+ - BREAKER MADE AVAILABLE BY DEMOLITION
^ - EXISTING BREAKER
M - METER
ST - SHUNT TRIP
GFCI - GROUND FAULT CIRCUIT INTERUPT
AFCI - ARC FAULT CIRCUIT INTERUPT
AUX - AUXILIARY CONTACT

No.	ISSUANCE	DATE
1	ISSUED FOR 90% OWNER'S REVIEW	2024.03.06
2	ISSUED FOR PERMIT	2024.03.25
3	ISSUED FOR OWNER'S REVIEW	2024.04.19
4	ISSUED FOR BID	2024.07.26

Hamilton

CLIENT
CITY OF HAMILTON

PROJECT
C13-21-24: Supply and install a Domestic Hot Water (DHW) Solar Thermal and Unit Heaters Upgrade

TITLE
ELECTRICAL SINGLE LINE DIAGRAM AND SCHEDULES

WALTERFEDY
TORONTO | CALGARY | **KITCHENER** | HAMILTON
800.685.1378 **walterfedy.com**

SEAL
LICENSED PROFESSIONAL ENGINEER
2024-08-08
P. GILJANOVIC
100123613
PROVINCE OF ONTARIO

SCALE :	N.T.S.
DATE :	2024.07.26
PROJECT NO :	2023-0524-10
DRAWN BY :	S.P.
CHECKED BY :	S.F.

SHEET NO :
E5.01

PLUMBING LEGEND

	EXISTING COLD WATER TO REMAIN
	COLD WATER
	EXISTING COLD SOFT WATER TO REMAIN
	COLD SOFT WATER
	EXISTING HOT WATER TO REMAIN
	HOT WATER
	EXISTING HOT WATER RECIRC. TO REMAIN
	HOT WATER RECIRC.
	EXISTING SANITARY BELOW TO REMAIN
	SANITARY BELOW
S	EXISTING SANITARY IN CEILING TO REMAIN
S	SANITARY IN CEILING
	EXISTING STORM BELOW TO REMAIN
	STORM BELOW
ST	EXISTING STORM IN CEILING TO REMAIN
ST	STORM IN CEILING
D	EXISTING DRAIN PIPING TO REMAIN
D	DRAIN PIPING
G	EXISTING GAS PIPING TO REMAIN
G	GAS PIPING
GLS	EXISTING GLYCOL SUPPLY TO REMAIN
GLS	GLYCOL SUPPLY
GLR	EXISTING GLYCOL RETURN TO REMAIN
GLR	GLYCOL RETURN
HGLS	EXISTING HEATING GLYCOL SUPPLY TO REMAIN
HGLS	HEATING GLYCOL SUPPLY
HGLR	EXISTING HEATING GLYCOL RETURN TO REMAIN
HGLR	HEATING GLYCOL RETURN
	EXISTING TO BE REMOVED
	SHUT-OFF VALVE
	INLINE PUMP
E	CAP
	PIPING UP
C S	PIPING DOWN
FD	FLOOR DRAIN
	FLOW ARROW
	CONNECT TO EXISTING

VALVE LEGEND

	SHUT-OFF VALVE - SEE SPECIFICATIONS
B	BUTTERFLY VALVE
	CIRCUIT BALANCING VALVE
	GLOBE VALVE
SV	ELECTRICALLY SUPERVISED VALVE
SV	ELECTRICALLY SUPERVISED 3-WAY VALVE
	3-WAY VALVE
	AUTOMATIC CONTROL VALVE (ACV)
	GAS SHUT-OFF VALVE
P	PNEUMATIC 3-WAY VALVE
P	PRESSURE REDUCING VALVE
	PRESSURE RELIEF VALVE
	STRAINER
E	ELECTRIC 2-WAY VALVE
	AUTOMATIC AIR VENT
	CHECK VALVE
	THERMOSTATIC MIXING VALVE
	CONNECT TO EXISTING

GENERAL DRAWING NOTES

A DRAWINGS ARE GENERALLY DIAGRAMATIC. CONTRACTOR IS RESPONSIBLE FOR LAYING OUT MATERIAL IN CONJUNCTION WITH THE INTENT OF THESE DRAWINGS.

B DRAWINGS ARE TO BE INTERPRETED IN CONJUNCTION WITH ALL OTHER DISCIPLINE DRAWINGS AND SPECIFICATIONS.

C SYSTEMS CONNECT TO EXISTING SERVICES. ALLOW FOR ADDITIONAL FITTINGS AND OFFSETS AS REQUIRED IN ORDER TO CONNECT TO EXISTING. ALSO, ALLOW FOR ADDITIONAL LABOUR AND MATERIAL IN ORDER TO ADJUST DESIGNS TO AVOID INTERFERENCE WITH EXISTING SERVICES.

D TEMPORARY MEASURES SHALL BE DONE IN ORDER TO MAINTAIN SERVICES TO ALL OCCUPIED PORTIONS OF THE BUILDING DURING CONSTRUCTION. COORDINATE WITH THE OWNER FOR ANY REQUIRED SHUT-DOWNS, WHICH SHALL BE AFTER-HOURS OR WEEKENDS. PROVIDE TEMPORARY MATERIALS TO ALLOW FOR SWITCH-OVERS OR SHUT-DOWNS. TEMPORARY SERVCES MATERIAL AND INSTALLATION SHALL MEET THE SPECIFICATIONS UNLESS SPECIFICALLY APPROVED BY THE CONSTULTANT.

E WHERE DUCTWORK MODIFICATIONS ARE REQUIRED AND IMPACT EXISTING SYSTEMS, SYSTEMS ARE TO BE RE-BALANCED AS NOTED. WHERE AND IF REQUIRED DRIVES AND SHEAVES ARE TO BE REPLACED AS REQUIRED BY THE BALANCING CONTRACTOR.

F DUCT ELBOWS TO BE FULL RADIUS OR WITH TURNING VANES. REFER TO SPECIFICATIONS.

G DUCT TO DIFFUSER SHALL MATCH DIFFUSER NECK SIZE, UNLESS NOTED OTHERWISE.

H FOR FLEXIBLE DUCTWORK TO CEILING MOUNTED DIFFUSER. REFER TO TYPICAL DIFFUSER DUCTING DETAIL.

I ALL PIPING TO RADIANT CEILING PANELS, REHEAT COILS, CABINET HEATERS AND UNIT HEATERS TO BE 19mm (3/4") EXCEPT WHERE NOTED OTHERWISE.

J CONTRACTOR IS TO REVIEW EXISTING EQUIPMENT CONNECTIONS AND LAYOUT BEFORE DEMOLITION. ANY EQUIPMENT TO BE RE-INSTALLED SHALL BE INSTALLED PER MANUFACTURERS WRITTEN INSTRUCTIONS AND APPLICABLE CODES.

K FOR DUST CONTROL, CAP EXISTING DUCTS IN THE CONSTRUCTION AREA. CONNECTION TO EXISTING AIR DUCTS TO BE DONE AFTER COMPLETION OF ALL DUST PRODUCING TASKS.

L RELOCATE OR REROUTE EXISTING MECHANICAL EQUIPMENT AS REQUIRED TO ACCOMMODATE THE SCOPE OF NEW WORK.

M FIRE DAMPERS ARE REQUIRED TO BE INSTALLED ON NEW AND EXISTING DUCTS PASSING THROUGH RATED WALLS, CEILING AND FLOORS.

N RUN PIPING AND DUCTWORK IN CEILING SPACE UNLESS OTHERWISE NOTED.

O RUN DUCTWORK BETWEEN AND THROUGH JOISTS AS REQUIRED TO MAINTAIN EXISTING CEILING HEIGHTS. MODIFY/RE-INSTALL EXISTING JOIST BRIDGING AS REQUIRED.

P REMOVE AND REINSTALL EXISTING CEILINGS AS REQUIRED TO COMPLETE DEMOLITION AND NEW INSTALLATIONS.

Q ALL MATERIALS WITHIN RETURN AIR PLENUMS SHALL HAVE A FLAME-SPREAD RATING NOT MORE THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION NOT MORE THAN 50.

R CONTRACTOR TO ASSESS CONDITION OF EXISTING DUCTWORK PRIOR TO CONNECTIONS/MODIFICATIONS FOR SUITABILITY OF RE-USE . ANY DAMAGES TO DUCTWORK TO BE REPORTED TO CONSULTANT/ARCHITECT.

S COORDINATE LOCATION OF ACCESS DOORS IN GWB CEILINGS WITH OTHER TRADES. PROVIDE REFLECTED CEILING PLAN INDICATING LOCATIONS OF ALL ACCESS DOORS FOR APPROVAL PRIOR TO FINAL INSTALLATION.

DRAWING LIST

HEAT EXCHANGER SCHEDULE

TAG #	MANUFACTURER & MODEL	LOCATION	SYSTEM	COLD SIDE FLUID	HOT SIDE FLUID	COLD SIDE FLOW RATE (L/s)	HOT SIDE FLOW RATE (L/s)	COLD TEMPERATURE IN (°C)	COLD TEMPERATURE OUT (°C)	HOT TEMPERATURE IN (°C)	HOT TEMPERATURE OUT (°C)	SURFACE AREA (SQ. M.)	CONNECTION SIZE (mm)
HE-1	AIC LA14DW OR APPROVED EQUIVALENT	BLOCK C MECHANICAL ROOM	DHW (SOLAR)	WATER	WATER	0.13	0.06	35.3	44.6	47.4	40.1	0.014	19
HE-2	AIC LA14DW OR APPROVED EQUIVALENT	COMPRESSOR RM 76 / STEAM CLEAN RM 77 (BLOCK B)	DHW (SOLAR)	WATER	WATER	0.13	0.06	35.3	44.6	47.4	40.1	0.014	19
HE-3	AIC LA14DW OR APPROVED EQUIVALENT	MAINTENANCE & REPAIR UPPER LEVEL (BLOCK B)	DHW (SOLAR)	WATER	WATER	0.13	0.06	35.3	44.6	47.4	40.1	0.014	19

SOLAR PREHEAT TANK SCHEDULE

TAG #	MANUFACTURER & MODEL	CAPACITY (L)	INLET TEMPERATURE (°C)	OUTLET TEMPERATURE (°C)	REMARKS
ST-1	NYLE NWHSSG0085SNS OR APPROVED EQUIVALENT	321	44.6	35.3	-
ST-2	NYLE NWHSSG0085SNS OR APPROVED EQUIVALENT	321	44.6	35.3	-
ST-3	NYLE NWHSSG0085SNS OR APPROVED EQUIVALENT	321	44.6	35.3	-

SOLAR COLLECTOR SCHEDULE

TAG #	MANUFACTURER & MODEL	QTY	TOTAL GROSS SURFACE AREA (m^2)	TOTAL ACTIVE SOLAR SURFACE AREA (m^2)	INCLINATION	ORIENTATION	AZIMUTH	INSTALLED COLLECTOR POWER (kW)	REMARKS
SC-1	VIESSMANN WERKE GMBH & CO VITOSOL 200-FM SV2F OR APPROVED EQUIVALENT	2	5.02	4.66	45°	200°	20°	3.51	C/W BALLASTED FLAT ROOF MOUNTING KIT FOR EACH COLLECTOR
SC-2	VIESSMANN WERKE GMBH & CO VITOSOL 200-FM SV2F OR APPROVED EQUIVALENT	2	5.02	4.66	45°	200°	20°	3.51	C/W BALLASTED FLAT ROOF MOUNTING KIT FOR EACH COLLECTOR
SC-3	VIESSMANN WERKE GMBH & CO VITOSOL 200-FM SV2F OR APPROVED EQUIVALENT	2	5.02	4.66	45°	200°	20°	3.51	C/W BALLASTED FLAT ROOF MOUNTING KIT FOR EACH COLLECTOR

SOLAR LOOP PUMP SCHEDULE

TAG #	LOCATION	SYSTEM	FLOW (L/s)	PUMP HEAD (m)	VOLTAGE PH/Hz	MANUFACTURER & MODEL	REMARKS
SP-1	BLOCK C MECHANICAL ROOM	SOLAR WATER	0.06	7.6	120/1/60	WILO STAR 30U-25 OR APPROVED EQUIVALENT	307L X 160W X 498H. PUMP IS INTEGRAL TO SOLAR DIVICON DN25B UNIT.
SP-2	COMPRESSOR RM 76 / STEAM CLEAN RM 77 (BLOCK B)	SOLAR WATER	0.06	7.6	120/1/60	WILO STAR 30U-25 OR APPROVED EQUIVALENT	307L X 160W X 498H. PUMP IS INTEGRAL TO SOLAR DIVICON DN25B UNIT.
SP-3	MAINTENANCE & REPAIR UPPER LEVEL (BLOCK B)	SOLAR WATER	0.06	7.6	120/1/60	WILO STAR 30U-25 OR APPROVED EQUIVALENT	307L X 160W X 498H. PUMP IS INTEGRAL TO SOLAR DIVICON DN25B UNIT.

ELECTRIC UNIT HEATER SCHEDULE

TAG #	MANUFACTURER & MODEL	HEATING CAPACITY				AIR DATA					MOTOR INFORMATION		QTY
		HIGH STAGE		LOW STAGE		AIRFLOW (CFM)	TEMP RISE (°F)	HEAT THROW (ft.)	MAXIMUM MOUNTING HEIGHT (ft.)	DELIVERY	MOTOR HP	MOTOR TYPE	
		kW	BTU/HR	kW	BTU/HR								
EH-1	MODINE PTE400 OR APPROVED EQUIVALENT	40	136,500	20	68,200	2575	54	60	15	HORIZONTAL	1/6	TOTALLY ENCLOSED,PERMANENT SPLITCAPACITOR	11
NOTES:													

CIRCULATION PUMP SCHEDULE

TAG #	LOCATION	SYSTEM	FLOW (L/s)	PUMP HEAD (m)	VOLTAGE PH/Hz	MANUFACTURER & MODEL	REMARKS
P-1	BLOCK C MECHANICAL ROOM	SOLAR WATER	0.13	3	115/1/60	BELL & GOSSETT NBF-36 103401LF OR APPROVED EQUIVALENT	19 mm FLANGE, 146L X 157W X 162H
P-2	COMPRESSOR RM 76 / STEAM CLEAN RM 77 (BLOCK B)	SOLAR WATER	0.13	3	115/1/60	BELL & GOSSETT NBF-36 103401LF OR APPROVED EQUIVALENT	19 mm FLANGE, 146L X 157W X 162H
P-3	MAINTENANCE & REPAIR UPPER LEVEL (BLOCK B)	SOLAR WATER	0.13	3	115/1/60	BELL & GOSSETT NBF-36 103401LF OR APPROVED EQUIVALENT	19 mm FLANGE, 146L X 157W X 162H

GAS FIRED HEATER SCHEDULE

TAG #	MANUFACTURER & MODEL	BTU/HR INPUT	BTU/HR OUPUT	ENTERING AIRFLOW (CFM)@ 70°F	OUTLET VELOCITY (FPM)	AIR TEMP. RISE (°F)	MAX MOUNTING HEIGHT (FT.)	HEAT THROW (FT.) @MAX MTG HT	MOTOR TYPE	MOTOR HP	MOTOR RPM	QTY
UH-1	MODINE PTX300 OR APPROVED EQUIVALENT	300,000	246,000	4545	824	50	19	69	PSC	1/2	1075	28
NOTES:												

HYDRONIC EXPANSION TANK SCHEDULE

TAG #	MANUFACTURER & MODEL	TANK VOLUME (GAL)	MAX. ACCEPT. VOLUME (GAL)	DIMENSIONS		SYSTEM CONNECTION (in)	SHIPPING WEIGHT (Lbs)	MAX. WORKING PRESSURE (PSIG)	MAX. OPERATING TEMPERATURE (°C)	REMARKS
				DIAMETER (in)	LENGTH (in)					
ET-1	AMTROL EXTROL AX-40-DD OR APPROVED EQUIVALENT	23	11.3	15	33	3/4	64	125	115	-

No.	ISSUANCE	DATE
1	ISSUED FOR 60% OWNER REVIEW	2023-11-24
2	ISSUED FOR 90% OWNER REVIEW	2024-03-06
3	ISSUED FOR PERMIT	2024-03-26
4	ISSUED FOR OWNER REVIEW	2024-04-19
5	ISSUED FOR BID	2024-07-26
6	RE-ISSUED FOR BID	2024-12-13

KEYPLAN

Hamilton

CLIENT

CITY OF HAMILTON

PROJECT

C13-21-24: SUPPLY AND INSTALL A DOMESTIC HOT WATER (DHW) SOLAR THERMAL AND UNIT HEATERS UPGRADE

330 Wentworth St N, Hamilton, ON L8L 5W3

TITLE

LEGEND, SCHEDULES AND DRAWING LIST

WALTERFEDY

KITCHENER | HAMILTON | TORONTO | CALGARY

A PART OF WF GROUP

800.685.1378 walterfedy.com

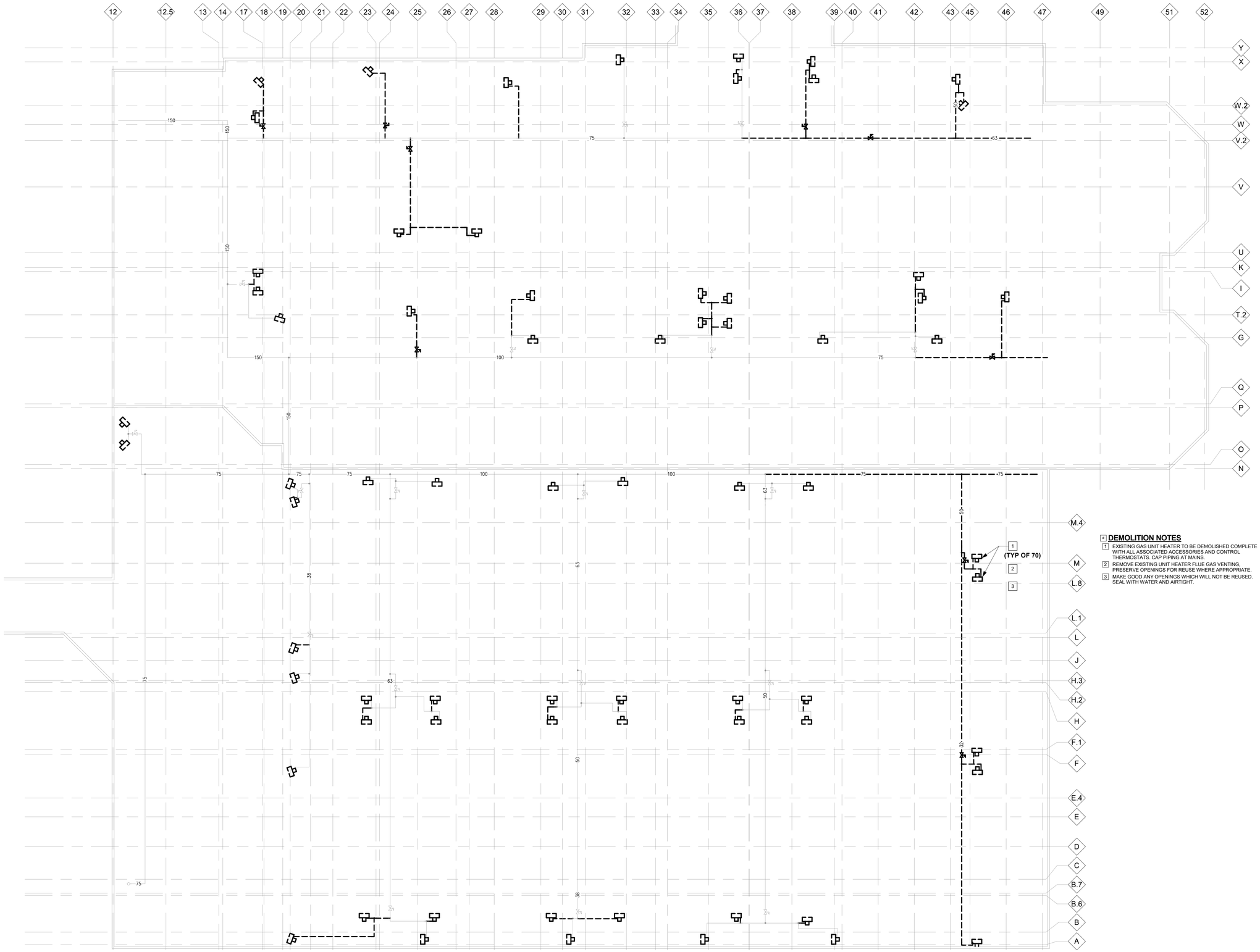
SEAL

LICENSED PROFESSIONAL ENGINEER
A. W. PORTENGEN
100216797
Dec. 13, 2024
PROVINCE OF ONTARIO

SCALE :	
DATE :	11/24/2023
PROJECT NO :	2023-0524-10
DRAWN BY :	D.P. / U.J.
CHECKED BY :	A.P.

SHEET NO :

M0.01

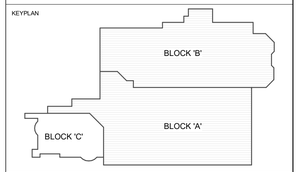


 # DEMOLITION NOTES

1. EXISTING GAS UNIT HEATER TO BE DEMOLISHED COMPLETE WITH ALL ASSOCIATED ACCESSORIES AND CONTROL THERMOSTATS. CAP PIPING AT MAINS.
2. REMOVE EXISTING UNIT HEATER FLUE GAS VENTING, PRESERVE OPENINGS FOR REUSE WHERE APPROPRIATE.
3. MAKE GOOD ANY OPENINGS WHICH WILL NOT BE REUSED. SEAL WITH WATER AND AIRTIGHT.

1 / M1.01 MECHANICAL DEMOLITION
Scale: 1 : 250

KEYPLAN



TRUE NORTH PROJECT NORTH

No.	ISSUANCE	DATE
1	ISSUED FOR 60% OWNER REVIEW	2023-11-24
2	ISSUED FOR 90% OWNER REVIEW	2024-03-06
3	ISSUED FOR PERMIT	2024-03-26
4	ISSUED FOR OWNER REVIEW	2024-04-19
5	ISSUED FOR BID	2024-07-26

Hamilton

CLIENT
CITY OF HAMILTON

PROJECT
C13-21-24: SUPPLY AND INSTALL A DOMESTIC HOT WATER (DHW) SOLAR THERMAL AND UNIT HEATERS UPGRADE
330 Wentworth St N, Hamilton, ON L8L 5W3

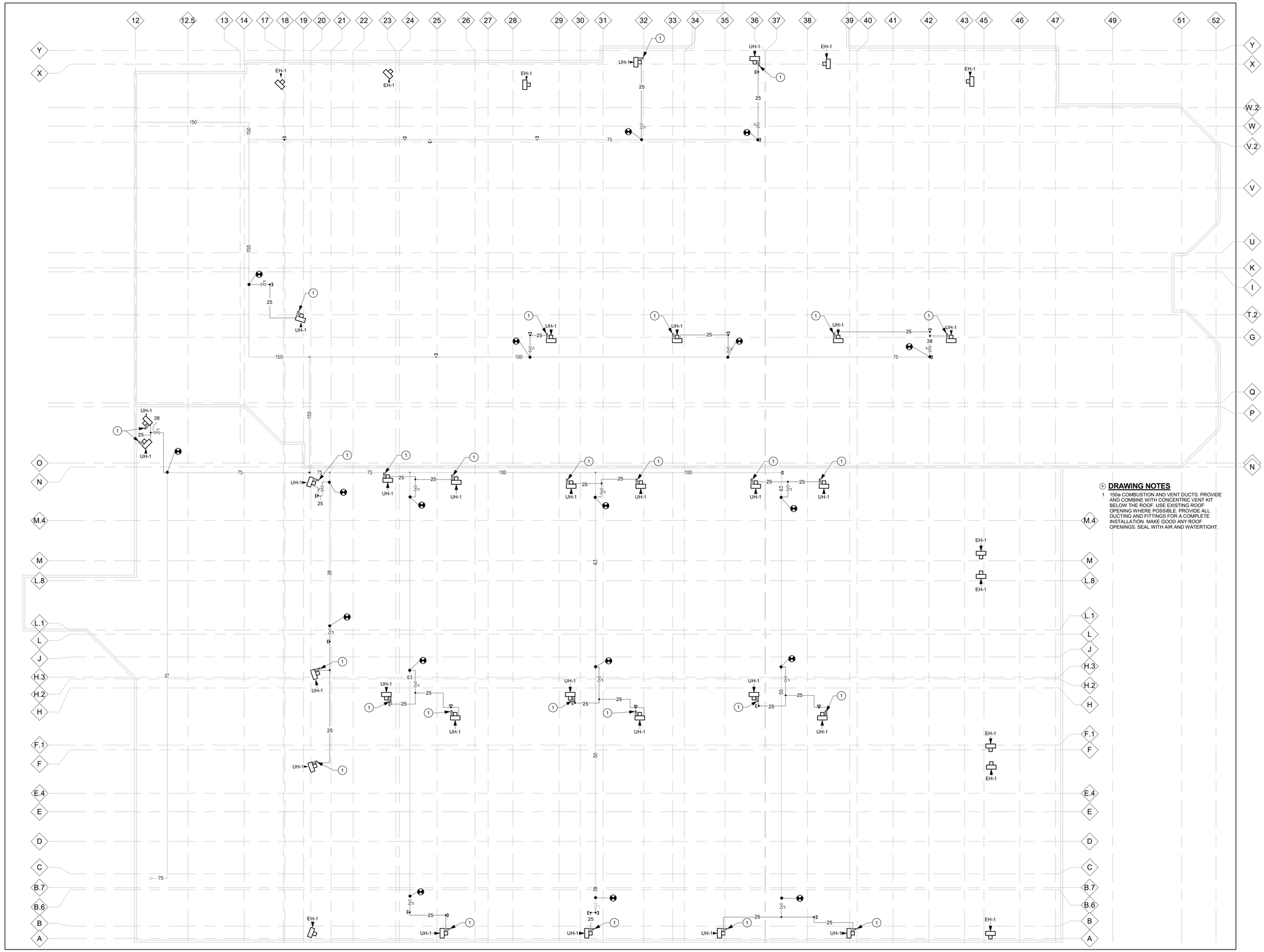
TITLE
MECHANICAL DEMOLITION

WALTERFEDY
KITCHENER | HAMILTON | TORONTO | CALGARY
A PART OF WF GROUP
800.685.1378 walterfedy.com

SEAL
LICENSED PROFESSIONAL ENGINEER
A. W. PORTENGEN
100216797
July 26, 2024
PROVINCE OF ONTARIO

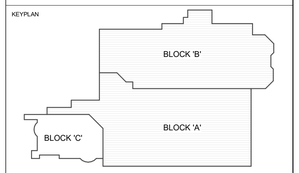
SCALE :	As indicated
DATE :	11/24/2023
PROJECT NO :	2023-0524-10
DRAWN BY :	D.P. / U.J.
CHECKED BY :	A.P.

SHEET NO : **M1.01**



1 / M1.02 MECHANICAL PLAN - BLOCK A AND B
Scale: 1 : 250

KEYPLAN



TRUE NORTH PROJECT NORTH

No.	ISSUANCE	DATE
1	ISSUED FOR 60% OWNER REVIEW	2023-11-24
2	ISSUED FOR 90% OWNER REVIEW	2024-03-06
3	ISSUED FOR PERMIT	2024-03-26
4	ISSUED FOR OWNER REVIEW	2024-04-19
5	ISSUED FOR BID	2024-07-26

Hamilton

CLIENT
CITY OF HAMILTON
71 Main St W, Hamilton, ON L8P 4Y5

PROJECT
C13-21-24: SUPPLY AND INSTALL A DOMESTIC HOT WATER (DHW) SOLAR THERMAL AND UNIT HEATERS UPGRADE
330 Wentworth St N, Hamilton, ON L8L 5W3

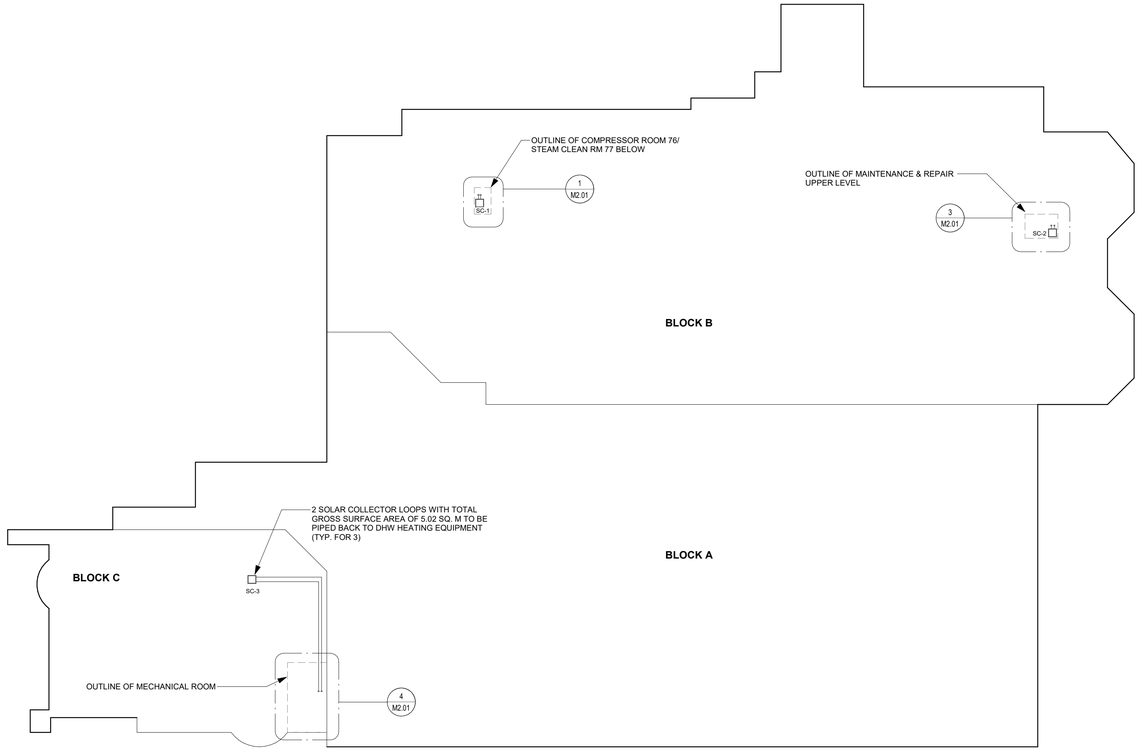
TITLE
MECHANICAL PLAN - BLOCKS A AND B

WALTERFEDY
KITCHENER | HAMILTON | TORONTO | CALGARY
A PART OF WF GROUP
800.685.1378 walterfedy.com

SEAL
LICENSED PROFESSIONAL ENGINEER
A. W. PORTENGEN
100216797
July 26, 2024
PROVINCE OF ONTARIO

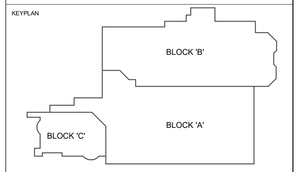
SCALE :	As indicated
DATE :	11/24/2023
PROJECT NO :	2023-0524-10
DRAWN BY :	D.P. / U.J.
CHECKED BY :	A.P.

SHEET NO :
M1.02



1 / M1.03 MECHANICAL ROOF PLAN
N.T.S.

KEYPLAN



TRUE NORTH PROJECT NORTH

No.	ISSUANCE	DATE
1	ISSUED FOR 60% OWNER REVIEW	2023-11-24
2	ISSUED FOR 90% OWNER REVIEW	2024-03-06
3	ISSUED FOR PERMIT	2024-03-26
4	ISSUED FOR OWNER REVIEW	2024-04-19
5	ISSUED FOR BID	2024-07-26

Hamilton

CLIENT

CITY OF HAMILTON

PROJECT

C13-21-24: SUPPLY AND INSTALL A DOMESTIC HOT WATER (DHW) SOLAR THERMAL AND UNIT HEATERS UPGRADE

330 Wentworth St N, Hamilton, ON L8L 5W3

TITLE

MECHANICAL ROOF PLAN

WALTERFEDY
KITCHENER | HAMILTON | TORONTO | CALGARY
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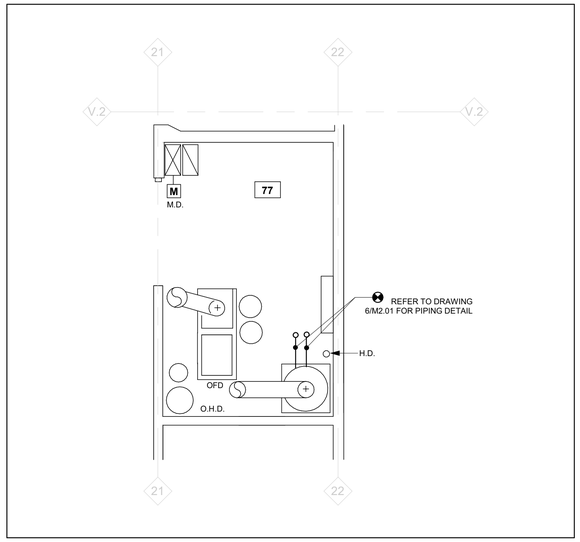
SEAL

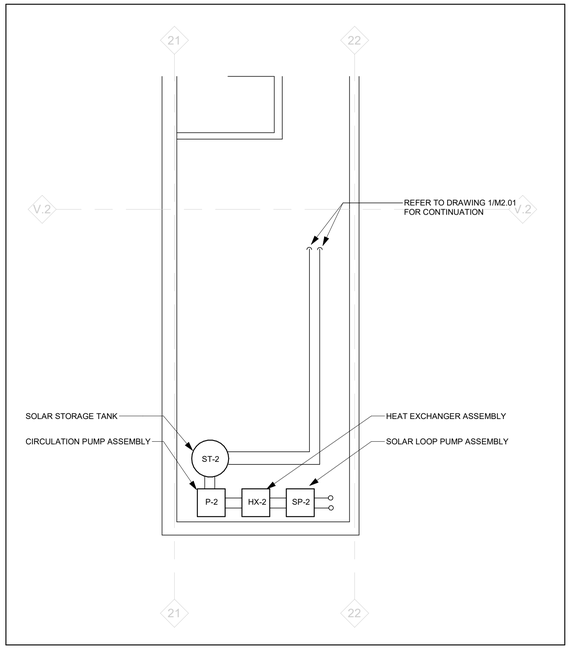
SCALE :	As indicated
DATE :	11/24/2023
PROJECT NO :	2023-0524-10
DRAWN BY :	D.P. / U.J.
CHECKED BY :	A.P.

SHEET NO :

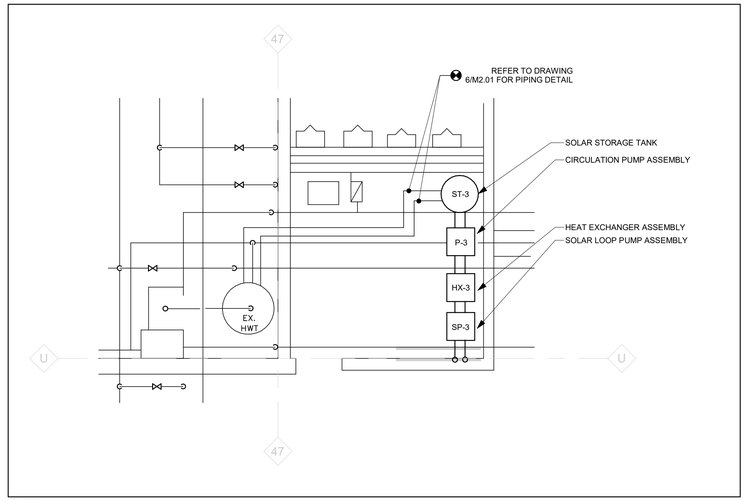
M1.03



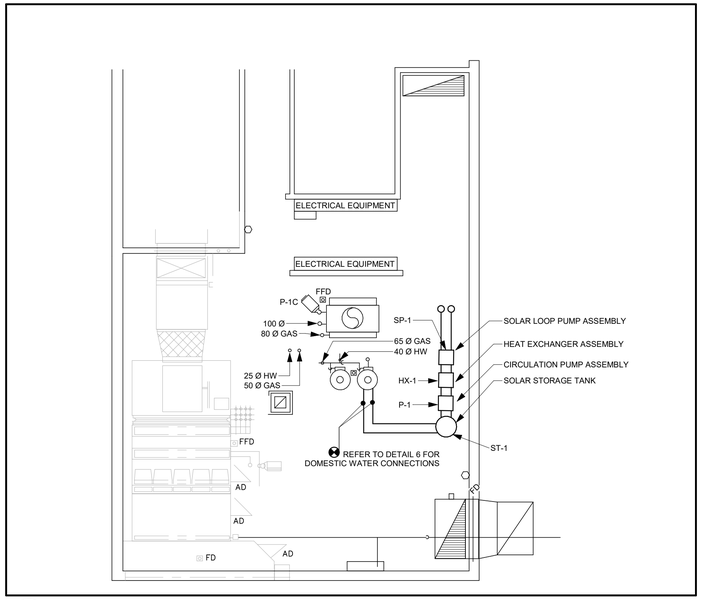
1 M2.01 RM 77 - PLUMB. & DRAIN. MOD. PLAN
Scale: 1 : 50



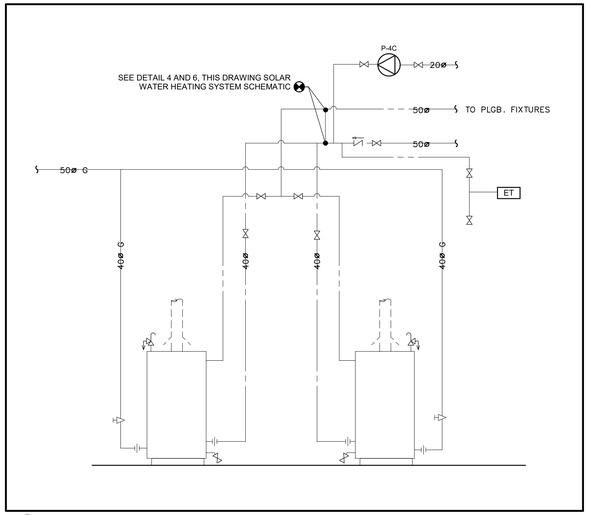
2 M2.01 RM 77 MEZZANINE - PLUMB. & DRAIN. MOD. PLAN
N.T.S.



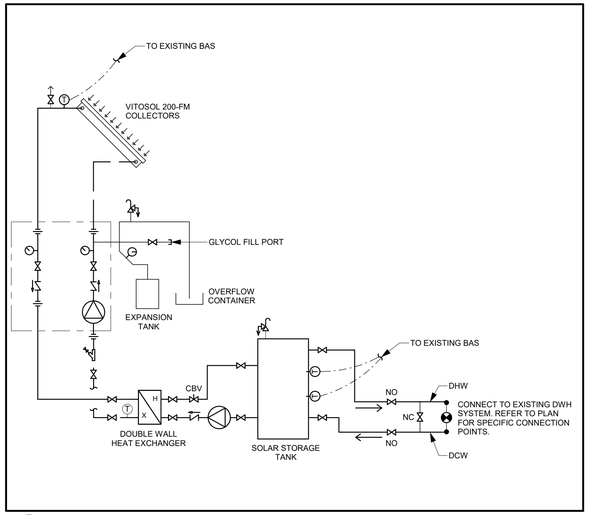
3 M2.01 MAINT. & REPAIR UPPER LEVEL PLBG -PLUMB. & DRAIN. MOD. PLAN
Scale: 1 : 50



4 M2.01 BLOCK 'C' MECHANICAL ROOM LOWER MODIFICATION PLAN
N.T.S.

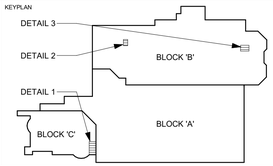


5 M2.01 BLOCK 'C' HOT WATER TANKS No.4 & No.5 SCHEMATIC
N.T.S.



6 M2.01 SOLAR WATER HEATING SYSTEM SCHEMATIC
N.T.S.

KEYPLAN



No.	ISSUANCE	DATE
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Hamilton

CLIENT
CITY OF HAMILTON

PROJECT
C13-21-24: SUPPLY AND INSTALL A DOMESTIC HOT WATER (DHW) SOLAR THERMAL AND UNIT HEATERS UPGRADE
330 Wentworth St N, Hamilton, ON L8L 5W3

TITLE
PLUMBING AND DRAINAGE DEMOLITION AND MODIFICATION PLANS

WALTERFEDY
KITCHENER | HAMILTON | TORONTO | CALGARY
A PART OF WF GROUP
800.685.1378 walterfedy.com

SEAL
LICENSED PROFESSIONAL ENGINEER
A. W. PORTENGEN
100216797
July 26, 2024
PROVINCE OF ONTARIO

SCALE :	As indicated
DATE :	11/24/2023
PROJECT NO :	2023-0524-10
DRAWN BY :	D.P. / U.J.
CHECKED BY :	A.P.

SHEET NO :
M2.01

C13-13-25 - Tender for General Contractor Required for Domestic Hot Water (DHW) Solar Thermal and Unit Heaters Upgrade at Wentworth Street Operations Centre

Opening Date: January 23, 2025 1:00 PM

Closing Date: February 18, 2025 3:00 PM

Bid Number: C13-13-25

***** *IMPORTANT* *****

Bidders are advised to review and confirm their bids&tenders™ vendor account is set up in the bidder's correct LEGAL name.

This name must exactly match the name on all documentation required of the Successful Bidder, eg; insurance certificate, WSIB certificate.

Schedule of Prices

* Denotes a "**MANDATORY"** field

Do not enter $0.00 dollars unless you are providing the line item at zero dollars to the City of Hamilton (unless otherwise specified).

If the line item and/or table is "**NON-MANDATORY**" and you are not bidding on it, leave the table and/or line item blank. Do not enter a $0.00 dollar value.

Cost of Work

Line Item No.	Description	Lump Sum Price *
1	Cost of Work	
	Subtotal:	

Summary Table

Bid Form	Amount
Cost of Work	
Total Contract Price:	

Specifications

Bidder's Business Structure

The City of Hamilton reserves the right to verify the business name and structure of the bidder, whether or not this section is completed, to ensure that the bidder is an existing legal entity. If the bidder is not an existing legal entity, the Bid will be rejected.

Business Structure of Bidder *	If 'Corporation' Selected, Specify Where Incorporated:	If 'Other' Selected, Specify Business Structure:	Registered Business Name of Bidder (if applicable):
Select A Value			

Documents

It is your responsibility to ensure the uploaded file(s) is/are not defective or corrupted and are able to be opened and viewed by the City. If the attached file(s) cannot be opened or viewed, your Bid shall be rejected.

BONDING UPLOAD SECTION

Each Bid submission must be accompanied by a **digital** bid bond.

The City will only accept submissions that include the bid bond in an electronically verifiable and enforceable (e-Bond) format.

A scanned PDF copy of the bond is not acceptable.

Instruction: After uploading the bid bond, ensure the uploaded bid bond is electronically verifiable and enforceable prior to submission of this Bid.

For additional infomation on Bid Security refer to the Request for Tenders document.

- Bid Bond * (mandatory)

Form of Tender

The bidder hereby acknowledges and agrees:

1. Submission of Bid

I/We the undersigned bidder, having examined the locality and site of the Work as well as all the Request for Tenders documents, hereby tenders and offers to furnish all material, labour, service, equipment, scaffolding and all incidentals, and to render all services and pay all applicable customs duties and taxes (other than any Value Added Taxes) and all other charges as specified and/or as necessary for performance and completion of the above referred to Work, all in full accordance with the Request for Tenders documents provided to the bidder by the City (receipt of which is hereby acknowledged) for the Base Bid Price (which is included in the "Contract Price" in the CCDC 2 – 2020 Stipulated Price Contract).

2. Base Bid Price

I/We confirm all prices provided in this Bid:

- are in Canadian funds
- include Provisional Items, if applicable
- include contingency allowances, if applicable
- include cash allowances, if applicable
- do not include Value Added Taxes

Any Value Added Taxes payable are for the account of the City and are in addition to the Base Bid Price stated in the Schedule of Prices.

I/We understand that if this Request for Tenders contains a contingency allowance, Provisional Item(s) or cash allowances, I/we are not entitled to payment thereof except for the extra or additional work carried out by me/us, as directed by the City and in accordance with the Contract and only to the extent of such extra or additional work and payment approved by the City.

3. Addenda

I/We have made any necessary inquiries with respect to Addenda issued by the City and have ensured that we have received, examined and provided for all Addenda to the Request for Tenders in this Bid.

4. Commencement and Completion

If awarded the Request for Tenders, I/we agree and undertake that:

- I/We will provide all necessary documents required as set forth prior to the commencement of the Work.
- I/We will commence the Work following receipt of a notice to proceed and otherwise in accordance with the Contract. I/We agree to have the Works "substantially performed" as described in the Construction Act (Ontario) and in accordance with the requirements set out in the Contract.
- in the event that I/we fail to perform the Contract as provided, I/we understand and agree that I/we shall be liable to liquidated damages and other remedies as specified in the contract documents.

5. Contract

I/We understand and agree that a binding contract shall come into being upon acceptance of this Bid by the City and the award of the Request for Tenders to me/us. The subsequent execution of the Contract for the Work is a formality and not a condition precedent to the existence of a binding contract.

6. Occupational Health and Safety

I/We understand and agree that the Work must be conducted in a safe manner. Accordingly, I/we confirm that I/we and all subcontractors used on the Work for the City of Hamilton will comply with all applicable laws, regulations and by-laws of Canada, the Province of Ontario and the City of Hamilton, including but not limited to the Occupational Health and Safety Act, and all applicable regulations thereunder. Further, without limiting any of the foregoing, I/we confirm that I/we have both a written occupational health and safety policy and program to implement that policy, and that all of our employees,

subcontractors and any other persons performing the Work shall be appropriately trained, licensed and certified, as required to perform the Work.

7. Fair Wage Policy and Schedule

I/We agree to comply in all respects with the City of Hamilton's Fair Wage Policy and to be fully responsible for ensuring that all of my/our subcontractors also comply in all respects with said Fair Wage Policy.

8. Execution

If this Bid is accepted by the City and the Request for Tenders is awarded to me/us, I/we agree to provide and pay for the proof of insurance, WSIB clearance certificate, performance of contract security and a labour and material payment bond as required by the contract documents, my/our health & safety manual and any other document identified in the award letter as being required by the City prior to it being able to issue a purchase order, and to execute the Contract, in quadruplicate, all within 10 Business Days after the City has issued its award letter or within such longer time period as the City may specify.

9. Bid Security

I/We have submitted the Bid Security as specified in the Request for Tenders. The Bid Security shall be irrevocable for **90 CALENDAR DAYS** after the closing date and time of the Request for Tenders.

In the event of default or failure on my/our part to execute the Contract as required above and to provide the specified security required under the Request for Tenders and the Contract, I/we agree that the City may at its discretion do one or more of the following: declare the Bid Security forfeited, annul the award or terminate the Contract, accept the next lowest compliant Bid, advertise for new tenders, or carry out the Work in any manner deemed in the best interests of the City. In such a case, if required by the City, I/we shall pay the City the difference between the Base Bid Price and any greater sum that the City may be obligated to pay by reason of that default or failure, including the cost of any advertisement for new tenders.

10. Time Open for Acceptance

I/We agree and confirm that this Bid is irrevocable and is to continue open to acceptance by the City for a period of **90 CALENDAR DAYS** after the closing date and time of the Request for Tenders. The City may at any time within the above **90 CALENDAR DAY** period accept this Bid whether or not any other Bid has previously been accepted, upon notice of acceptance and award in writing to me/us, personally delivered or mailed to me/us by ordinary prepaid mail, to the address provided in the Bid submission, or delivered by fax to the fax number set forth in the Bid submission. Any notice mailed or faxed shall be deemed to have been received on the date mailed or faxed. Any notice personally delivered shall be deemed to have been received on the date the notice is personally delivered.

11. No Collusion / Conflict of Interest

I/We hereby declare that no person, firm or corporation other than me/us has any interest in this Bid or in the proposed Contract for which this Bid is made. I/We further declare that this Bid is made without any connection, comparison of figures or arrangements with, or knowledge of, any other person making a Bid for the same work and is in all respects fair and without collusion or fraud.

I/We confirm that we comply with Article 12 - Conflict of Interest, Lobbying and Collusion of the Instructions to Bidders and Article 4 – Joint Ventures of the Supplementary Instructions to Bidders.

I/We understand that, without limiting or restricting any other right or privilege of the City, the City may terminate the Contract where the bidder is in contravention with the City's Procurement Policy with respect to conflict of interest or vendor eligibility.

12. Interpretation

I/We confirm that we have received no oral information, instruction or advice from any officer, employee, agent or consultant of the City which changes the content of the Request for Tenders and all Addenda thereto.

I/We acknowledge and agree that we have not assumed that any information concerning our operations, business or personnel or any other information required to be provided by us when submitting our Bid is known to the City, regardless of whether such information may be actually previously known to the City or not. Further, we acknowledge and agree that all information to be provided by us is to be complete and full and in such detail as required.

13. Procurement Policy

In submitting a Bid in response to the Request for Tenders, I/we agree and acknowledge that I/we have read and will be bound by the terms and conditions of the City's Procurement Policy. I/We understand that the City's Procurement Policy can be viewed on the City's website at: https://www.hamilton.ca/build-invest-grow/buying-selling-city/bids-and-tenders/procurement-policy-by-law

14. Ontarians with Disabilities Act, 2001 and Accessibility for Ontarians with Disabilities Act, 2005

I/We confirm that I/we and all Subcontractors used on the Work for the City of Hamilton will comply with all applicable accessibility laws, regulations and by-laws of Canada, the Province of Ontario and the City of Hamilton, including but not limited to the Ontarians with Disabilities Act, 2001 (ODA), the Accessibility for Ontarians with Disabilities Act, 2005 (AODA), Ontario Regulation 429/07 (Accessibility Standards for Customer Service) and Ontario Regulation 191/11 (Integrated Accessibility Standards), throughout the term of the Contract. Without limiting the generality of the foregoing, I/we shall provide to the City, prior to commencing Work, a Statement of Acknowledgement that I/we have read and understand the City's AODA Integrated Accessibility Standards and Customer Service Standard Handbook (the "Handbook"), that I/we have provided the training required by the Handbook, and that I/we will comply with the requirements of the Handbook and applicable accessibility laws, regulations and by-laws. See City of Hamilton's AODA Integrated Accessibility Standards and Customer Service Standard Handbook at: https://www.hamilton.ca/people-programs/equity-diversity-inclusion/accessibility-services/accessibility-guidelines-policies#policies-procedures

15. Compliance with City of Hamilton By-laws

I/We declare that I/we are in compliance with all municipal by-laws as they pertain to the City of Hamilton in respect of the operation of my/our business and in respect of the Work described in the Request for Tenders. I/We understand and agree that if this statement is untrue or incorrect, the City of Hamilton shall be entitled at its sole discretion to reject this Bid, or if such untruth or incorrectness comes to light after this Bid is accepted, to terminate or refuse to enter into, as applicable, any Contract and to pursue any other legal recourse the City deems appropriate, and that such untruth or incorrectness shall be a default under the Contract.

16. Lump Sum Breakdown

I/We understand and agree that after the opening of the Bids, if I/we are one of the two apparent low bidders, if requested by the City we are required to submit to the Tender Coordinator, within two Business Days of the closing date of the Request for Tenders, the document entitled Lump Sum Breakdown of Base Bid Price. The breakdown shall be given on the breakdown pages provided in the Request for Tenders. I/We acknowledge and agree that the City may refuse to accept any breakdown which contains prices considered to be unbalanced and may request me/us to adjust the breakdown to correct such unbalancing, and I/we agree to do so upon such request of the City.

17. Provisional Items

I/We understand and agree that, after the award of the Request for Tenders, the City reserves the right to delete from the Base Bid Price one or more of the items identified in the Schedule of Prices as Provisional Items, without penalty or compensation to the Successful Bidder, for credit at the price shown in the table. All prices are inclusive of all duties and taxes applicable, except for Value Added Taxes.

I/We understand that I/we are required to complete the table in the Schedule of Prices for each Provisional Item listed. I/We understand that failure to do so will result in the rejection of this Bid by the City.

I/We agree that the Unit Prices provided for each Provisional Item include all costs required for complete execution of the item of work, including the bidder's office staff, site supervisory staff, project management costs, clerical and other costs for documentation, materials, labour, equipment, delivery, handling, statutory charges, overhead and profit, other related charges, inclusive of all other duties and taxes applicable, and similar charges on account of such item of work. Unit Prices entered shall exclude all Value Added Taxes.

I/We agree that if the quantity actually required for each item of work is more or less than estimated, the extended price for such item of work will be increased or decreased respectively using the same Unit Price or Lump Sum Price specified in the Schedule of Prices.

I/We agree that these Provisional Items are in addition to the requirements outlined in the Specifications. I/We understand that

if I/we are awarded the Request for Tenders, I/we are not entitled to payment for any Provisional Item except for the extra or additional work carried out by me/us, as directed by the City and in accordance with the Contract and where payment was previously approved by the City.

18. Alternatives

I/We understand and agree that alternatives to specified equipment suppliers and/or equipment in the Request for Tenders will not be considered by the City prior to the award of the Request for Tenders.

19. Electronic Funds Transfer
I/We acknowledge and agree to provide the City with the information required for the City to make payment by EFT.

☐ I/WE agree to be bound by the terms and conditions and have authority to bind the Bidder and submit this Bid on behalf of the Bidder.

Conflict of Interest
Except with the prior express written consent of the City, **prior to submitting this Bid**, vendors are required to notify the City in writing, of any potential conflict of interest that may arise prior to the award of any contract and fully disclose any details thereof. Failure on the part of a vendor to declare a conflict of interest to the City and to obtain the City's prior express written consent to waive the conflict of interest shall result in the vendor being ineligible to Bid and shall form a basis for rejection of a Bid submitted to the City.

Do you have a potential conflict of interest? ○ **Yes** ○ **No**

Acknowledgement of Addenda
The Bidder acknowledges and agrees that any Addenda below form part of the bid document.

Please check the box in the column "**I have reviewed this addendum"** below to acknowledge each of the Addenda.

File Name	I have reviewed the below addendum and attachments (if applicable)	Pages
There have not been any addenda issued for this bid.		