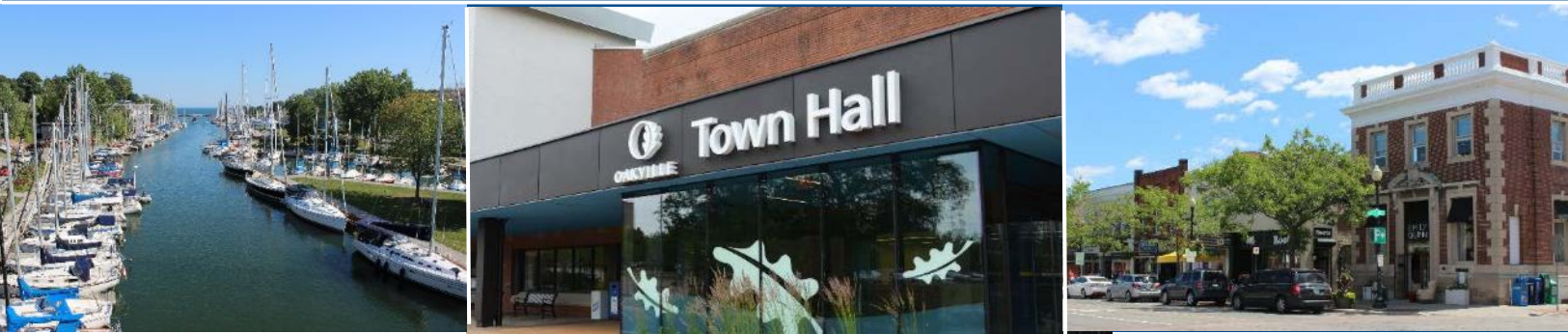




OAKVILLE



Request for Tenders Transit Building Renovations-Municipal Enforcement Services (MES) RFT-18-2024

Contact

Diana Serrano, CSCMP
Senior Purchasing Coordinator
diana.serrano@oakville.ca
905-845-6601, ext. 3012

Obtain documents online

<https://oakville.bidsandtenders.ca>

Closing date

On or before 2:00 p.m.
April 23, 2024

Closing location

<https://oakville.bidsandtenders.ca>
(the Bidding System)

Electronic bid submission only

The Town of Oakville (the town) invites tenders for construction services described as:
The provision of construction services to renovate the existing Municipal Enforcement Services (MES) space at the Oakville Transit facility, located at 430 Wycroft Road, Oakville, ON L6K 2G7. Further described in Section 4 Scope of Work and Specifications.

To Obtain Documents Online please visit: <https://oakville.bidsandtenders.ca>

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

All bidders shall have a Bidding System vendor account and be registered as a Plan Taker for this bid opportunity, which will enable the bidder to download the Request for Tender without the watermark preview, to receive addenda email notifications, download addenda and to submit their bid electronically through the Bidding System.

Bidders are cautioned that the timing of their bid submission is based on when the bid is successfully received by the Bidding System, not when a bid is submitted by a bidder, as bid transmission can be delayed in an “internet traffic jam” due to file transfer size, transmission speed, etc. It is a bidder’s responsibility to deliver its bid to the proper place at the proper time, and to transmit their bid sufficiently in advance of the time set for receipt of bids to allow for timely receipt by the town.

For the above reasons, the town recommends that bidders allow sufficient time to upload their bid submission and attachment(s) (if applicable) and to resolve any issues that may arise. The closing time and date shall be determined by the town’s Bidding System web clock.

The town also recommends that bidders take advantage of the Bidding System feature that allows bidders to view their uploaded documents prior to submission of their bid. By doing so, a bidder may avoid an error that could occur by uploading an incorrect or unreadable file, which would render their submission non-compliant.

The Bidding System will send a confirmation email to the bidder advising that their bid was submitted successfully. If you do not receive a confirmation email, contact technical support at bids&tenders™ via telephone at 1-800-594-4798, or email to support@bidsandtenders.ca. Late Bids will not be accepted.

To ensure receipt of the latest information and updates via email regarding this bid, the onus is on the bidder to create a Bidding System vendor account and register as a Plan Taker for the bid opportunity at <https://oakville.bidsandtenders.ca>.

All inquiries must be submitted through the bidding system by utilizing the Submit Question button.

The town’s Procurement Policy By-law forms part of all competitive bid documents. The By-law can be found on the Town of Oakville website at: oakville.ca/business/quotes-quotes.html

Leanne Dacosta
Manager of Purchasing and Risk Management

NOTICE

Further to the recent amendment to the Construction Act, Construction Act, R.S.O. 1990, c. C.30, the provisions of the Act, are incorporated in the tender document by this reference, except as otherwise provided in the tender document and the CCDC form of contract.

If any provision contained in the tender document and or the contract including the supplementary conditions, conflict with or is inconsistent with the Construction Act, the Act shall govern and control.

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SCHEDULE OF EVENTS

THESE DATES ARE APPROXIMATE AND SUBJECT TO CHANGE

Release of RFT	March 28, 2024
Mandatory Site Visit	April 9, 2024
Close of Question Period	2:00 pm, April 16, 2024
RFT Closing Date	2:00 pm, April 23, 2024

Mandatory Site Visit:

Date and Time:	Tuesday, April 9, 2024, at 10:30 a.m.
Location:	Oakville Transit facility, 430 Wyecroft Road, Oakville, ON L6K 2G7 Bidders should not park on the visitor parking spots. Bidders to park at the rear end of the parking lot near the grey coloured shed located on the southeast side of the parking lot. Bidders to meet at the main entrance location of the Oakville Transit building to sign-in with the Purchasing representative.

**The Corporation of the Town of Oakville
REQUEST FOR TENDER # RFT-18-2024
Transit Building Renovations-Municipal Enforcement Services (MES)**

The Town of Oakville (hereafter referred to as the town) will receive tenders for the provision of construction services to renovate the existing Municipal Enforcement Services (MES) space at the Oakville Transit facility, located at 430 Wyecroft Road, Oakville, ON L6K 2G7. Further described in Section 4 Scope of Work and Specifications.

1.1 Instructions to Bidders

1.1.1 **Electronic bid submissions only, shall be received by the Bidding System, on or before 2:00 p.m. (14:00 hours) local Oakville time, on April 23, 2024.**

1.1.2 Should the town receive a bid that is subsequently found to be from a bidder that is not registered with bids&tenders™, and the bidder did not obtain their bid document from <https://Oakville.bidsandtenders.ca>, the town reserves the right to remove the bid from further consideration. Bids submitted by any other method will not be accepted.

1.1.3 It is the sole responsibility of each bidder to make sure that its bid is delivered and be received by the Bidding System, on or before 2:00 p.m. (14:00 hours) local time. Tenders received after the specified closing date and time will not be accepted by the Bidding System.

1.1.4 There will not be a public opening for this tender. When tenders are opened the total tendered price(s) "As Read" bid results will be posted to the town's Bidding System at <https://oakville.bidsandtenders.ca> and are typically available within 24 hours of the tender closing.

Bid results will not be provided in any other manner.

1.1.5 Following the opening, all bids will be reviewed for compliance with the tender terms and conditions. Once the determination of compliance is complete, bid results will be updated on the town's Bidding System at <https://oakville.bidsandtenders.ca> if required.

1.1.6 The town shall not be liable for any costs, expenses, loss or damage incurred by any bidder in the preparation and submission of a tender, the tender process, including the evaluation and interview process (if any), in the negotiation, preparation and execution of the award, or the acceptance or non-acceptance by the town of any tender, and by submitting a bid each bidder shall be deemed to have agreed that it has no claim. The town shall not be liable for any costs, expenses, loss or damage resulting from any technical difficulty with the Bidding System, including, without limitation, a power failure or a bidder's inability to upload a bid submission.

1.1.7 The working language of the town is English and all responses to this Request for Tender must be in English.

1.2 Site Meeting

1.2.1 Where a site meeting is mandatory, bidders must sign in prior to start of meeting. Once the meeting begins, the sign-in sheet will be removed. No late sign-in will be permitted. Bids will only be accepted from bidders who are signed in and in attendance for the entire meeting.

- 1.2.2 In the event that no potential bidders or only one potential bidder attends the mandatory site meeting, the town reserves the right in its absolute discretion to re-schedule a second meeting to ensure competitive bid submissions are received in accordance with the town's Procurement Policy By-law.
- 1.2.3 Before submitting a tender, bidders shall carefully examine drawings, specifications and site conditions, fully inform themselves of all existing conditions and limitations and shall include in the tender, sums to cover the cost of all work included in the tender document. The bidder shall accept sole responsibility for any error or neglect in respect to this requirement and no allowance shall be made by the town for the bidder's failure to do so.

1.3 Clarification

- 1.3.1 If a bidder finds discrepancies in or omissions from the tender documents, or if a bidder is in doubt as to their meaning, questions must be submitted through the Bidding System portal by clicking on the "Submit Question" button on the bid details page for the applicable opportunity. Questions received after the deadline or via any other method are not guaranteed a response.
- 1.3.2 The town shall not be bound by any oral instruction, amendment, clarification, information, advice or suggestion from any town staff or consultant to the town.
- 1.3.3 Correspondence sent to persons other than the designated purchasing contact, including other potential bidders, with respect to the tender, may be grounds for disqualification, and the town may, in its discretion, and in addition to any other rights or remedies available at law, reject any potential or actual tender by that bidder.

1.4 Addenda

- 1.4.1 The town reserves the right at any time prior to the closing time:
- to withdraw or cancel the Request for Tender;
 - to extend the time for the submission of bids; or
 - to modify these instructions, the schedule of prices, the specifications, or the description of the project, work or supply;

By the publication of an addendum or other notice, and the town 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.

- 1.4.2 Bidders shall acknowledge receipt of any addenda when submitting their bid through the Bidding System. Bidders shall check the appropriate box for each addenda and any applicable attachments that have been issued. This must be done before a bidder can submit their bid submission. Addenda shall become part of the tender documents and will be considered in determining the bid price(s).
- 1.4.3 Addenda will be issued through the Bidding System, typically forty-eight (48) hours prior to the closing date and time, unless otherwise approved. It is the responsibility of the bidder to have received all addendum/addenda that have been issued. Bidders should check online at <https://oakville.bidsandtenders.ca> prior to submitting their bid and up until bid closing date and time in the event additional addenda are issued.

- 1.4.4 If a bid has been submitted prior to an addendum/addenda being issued by the town, the Bidding System shall automatically **retract** the bid submission. The bid submission status will be changed to an **incomplete status** (NOT accepted by the town). The retracted bid can be viewed by the bidder in the "**MY BIDS**" section of the Bidding System. The bidder becomes solely responsible for the following actions:
- i) make any required adjustments to their bid; and
 - ii) acknowledge the addendum/addenda; and
 - iii) Ensure the re-submitted Bid is successfully **received** by the Bidding System on or before 2:00 p.m. (14:00 hours) local Oakville time, on the bid closing date.

SPECIAL NOTES:

It is strongly recommended that bidders have one or more "invited" company contacts in your Bidding System vendor account with their own unique login to the Bidding System. This will permit these contacts to manage (register, submit, resubmit, edit and withdraw) bids for which your company is a Registered Plan Taker. In the event the original contact becomes unavailable, these additional contacts may act on your company's behalf and have the authority to receive addendum notifications from the Bidding System; submit bids electronically through the Bidding System; and/or withdraw, edit, acknowledge addendum/addenda or resubmit, etc. on your behalf.

Do **not** invite any additional contacts that you do not want to have access to view, edit, submit, resubmit and/or withdraw or who may be in direct competition, for example a company may have two divisions that could compete for the same bid opportunity.

If you are an invited company contact, it is imperative that you create your login from the link contained in the email invitation. Do NOT go directly to the website and create a separate vendor account.

1.5 Withdrawal of Bids / Irrevocable

- 1.5.1 Bidders may edit or withdraw their bid submission online through the Bidding System prior to the closing date and time. However, the bidder is solely responsible to:
- i) make any required changes to their bid (if applicable); and
 - ii) in the case where the bidders wishes to re-submit a bid, it is **received** by the Bidding System before the specified bid closing date and time.
- 1.5.2 Requests to withdraw bids received by the Bidding System will not be considered after the closing date and time.
- 1.5.3 A bid shall be irrevocable (i.e. open for acceptance by the town) for a period of sixty (60) days following the closing date for the tender.

1.6 Confidentiality/Non-Disclosure of Information

- 1.6.1 It is town practice to disclose the name of the successful bidder(s) and the total contract price. The town shall make every effort to safeguard the confidentiality of other information included in each submission; however, all submissions are subject to the provisions of the Municipal Freedom of Information and Privacy Act (MFIPPA and the Personal Information Protection and Electronic Documents Act.

- 1.6.2 The personal data provided by the town to the successful bidder (or collected on behalf of the town by the successful bidder) shall be used in compliance with Section 31 of the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA).

The successful bidder agrees that during and after the effective period of the contract, all information provided to the successful bidder by the town shall be treated as privileged and confidential and shall not be used by the successful bidder for any other purpose nor divulged to any third party for any reason whatsoever without the written permission of the town, and which is specifically authorized by MFIPPA.

- 1.6.3 The Town of Oakville logo should not be used by the bidder without express permission from the town, as the Logo is a registered trademark belonging to the Town of Oakville.

1.7 Schedule of Prices (Bid Form)

- 1.7.1 The amounts stipulated on the bid form is intended to cover the cost of the complete work as described in this tender.
- 1.7.2 All prices to be tendered in Canadian Funds, FOB Destination (town locations). HST will be extra and should not be included in bid prices.
- 1.7.3 The bid form may include a "Contingency" amount that has been identified for unforeseen work that may arise. Payment from this amount will be for work requested and/or approved by the town.
- 1.7.4 Pricing for any requests under the heading Optional Prices will not to be included in the summary table. Optional items may or may not be selected and added to the total contract amount at the sole discretion of the town.
- 1.7.5 Pricing for any requests under the heading Provisional Prices will be included in the summary table. Provisional items may be cancelled by the Project Manager at any time during the contract. The Contractor shall have no claim for delay and loss of overhead or profit should the Project Manager decide to delete any or all Provisional Items.
- 1.7.6 The person submitting the bid on behalf of the bidder shall have authority to bind the bidder.
- 1.7.7 All information required on forms shall be completed in full including references and subcontractors that it proposes to use for work described.

The town will also review the bidder's prior performance on other contracts with the town or conduct on previous contracts with the Town or other institutions.

- 1.7.8 All price(s) submitted shall be a reasonable price for each particular item as determined by the purchasing agent and under no condition will an unbalanced tender be considered. Submissions containing prices which appear to be so unbalanced as to likely affect the interests of the town adversely will be clarified and may be rejected.

1.8 Bid Bond / Agreement to Bond

- 1.8.1 Each Tender must be accompanied by a 10% Bid Bond.

- 1.8.2 Bonds shall be from a Surety Company authorized by law to carry on business in the Province of Ontario, in favour of the Town of Oakville. Bonds must be irrevocable and open for bid acceptance for at least sixty (60) days from the date of bid closing.
- 1.8.3 Each submission must be accompanied by both a digital Bid Bond **and** a digital Agreement to Bond. The town will only accept submissions that include both the Bid Bond and Agreement to Bond in an electronically verifiable/enforceable (e-Bond) format. For more information regarding e-Bonds bidders are encouraged to contact their surety company or visit the Surety Association of Canada at the following link:
<https://www.surety-canada.com/en/ebonding/index.html>
Information at this site includes;
- A list of third parties that provide online surety digital bond services such as Mobile Bonds or Xenex. The town does not endorse or promote any third party digital bond service provider.
 - An Industry Checklist which Digital Bonds provided should meet.
- 1.8.4 All instruction details for accessing authentication should be included with the uploaded Bond.
Note: A scanned pdf copy of a Bid Bond or an Agreement to Bond are not acceptable.
- 1.8.5 Where a surety provides the Bid Bond and Agreement to Bond in a single zipped file download, bidders shall upload this file to the town's Bidding System, in the bid submission file labelled "Bid Bond and Agreement to Bond". Bidders are cautioned not to alter the file in any way prior to uploading as this could affect the electronically verifiable/enforceable format.
- 1.8.6 Where a surety provides the Bid Bond and Agreement to Bond separately, bidders shall create a **single zip file** (see Bidding System instructions on how to create a zip file) containing both the Bid Bond and Agreement to Bond and upload the zipped file to the file labelled "Bid Bond and Agreement to Bond". **Do not merge electronic bond files manually.**
- 1.8.7 Any costs associated with e-Bonds are the responsibility and cost of the bidder. No interest will be paid on any bid deposit.

1.9 Performance Bond & Labour and Material Bond

- 1.9.1 Upon award, the successful bidder shall provide a **50% Performance Bond and a 50% Labour and Materials Bond**, in an original form, issued by a reputable bonding company, licensed to carry on business in Ontario, payable to the Town of Oakville. Bonds must be in original form, completed, duly signed and executed, and submitted to the town when requested.
- 1.9.2 If the successful bidder fails to provide a performance bond and labour and materials bond when requested, the town shall declare the bid deposit forfeited and the bidder will be held responsible for any increased costs or damages incurred by the town. Any bidder who fails to provide all required documents within the timelines provided, or otherwise fails to enter into an agreement with the town upon notice of being the successful bidder may be subject to suspension by the town and prohibited from bidding for a period of up the three (3) years.

1.9.3 Performance surety shall guarantee all conditions as set out in the contract, including proper execution of the work and for all matters for which the successful bidder is responsible for throughout the one-year period of maintenance and warranty.

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

1.10 Brand Names

1.10.1 Any reference to the trade name, brand name or catalogue number of a particular manufacturer shall be understood to have been made solely for the purpose of establishing and describing general performance and quality levels of the item to be supplied and shall not be construed to restrict bidders to that manufacturer. Where substitutes are not being accepted the Specifications and/or the Bid Form shall indicate "No Substitutes". It should be noted that in some cases specified products may be town Standards and may not be considered for substitution.

1.10.2 Where approved equivalents are permitted, approval must be obtained from the town, in writing, prior to acceptance. Requests must be submitted through the online system using the "submit a question" button for consideration during the open question period, prior to cut off.

Include brand name and model number of the substitute manufacturer. It is not necessary to submit samples unless requested, although it is the bidder's responsibility to demonstrate that the product bid meets the specifications. Contractor or Supplier shall be responsible for all costs associated with the use of the "approved equal". The onus is on the Contractor or Supplier to provide all pertinent information in the request so the town can review and make a determination as to acceptability of the proposed substitute. Once a decision has been rendered it will not be reexamined.

The town shall be the sole judge (in its absolute discretion) as to whether an equivalent meets its specifications.

If no substitution is indicated, it will be assumed the price is for the product specified and the town will not accept substitutes after closing of the bid.

1.11 Guidelines Regarding Bid Irregularities

1.11.1 A bid irregularity is a variance between the requirements (terms, conditions, specifications, special instructions) of a bid request and the information provided by the bidder in a bid response.

1.11.2 Examples below represent the general types of bid irregularities and the resulting action. This list is not inclusive and for irregularities not listed the Manager of Purchasing shall determine the resulting action. The town shall have the right to accept or reject any or all bids, to waive minor irregularities at its sole discretion, or request a bidder rectify any deviation at the town's sole discretion.

Late Bid	Bid received after the closing date and time specified in the bid documents.	Bidding System does not accept late bids
Site Meeting	Bidder did not attend a mandatory site meeting.	Bid not accepted by the Bidding System
Method of Delivery	Where the bid has been submitted via any other method other than as allowed for in the bid documents.	Bid Declared Non-Compliant
Format	Bid not on the form supplied by the town or not in the format specified by the town.	Bid Declared Non-Compliant
Bid Bond	Amount less than the amount indicated in the bid document.	Bid Declared Non-Compliant
Bid Bond / Agreement to Bond	Bond is missing, not an electronically verifiable/enforceable (e-Bond), or bonding company not licensed to conduct business in Ontario.	Bid Declared Non-Compliant
Qualified Bid	Where the bid has been qualified by changes to specification or major requirements and acceptance would allow an unfair advantage over competitors.	Bid Declared Non-Compliant
Failure to Execute	Fails to execute a contract or supply supplementary documents after Intent to Award letter has been issued.	Bid Set Aside

1.12 Reserved Privileges of the Owner

1.12.1 Without limiting or restricting any other right or privileges, the town shall have the following reserved rights and privileges, which may be exercised or waived in its absolute discretion to:

- a. reject any or all bids and the lowest tender will not necessarily be accepted;
- b. reject any bid where the bidder has failed to execute a Contract or provide performance surety for any awarded Contract for the town in the past;
- c. reject any tender where the bidder has defaulted or failed to satisfactorily complete other work for the town in the past;
- d. reject any tender that contains qualifying conditions or otherwise fails to conform to these tender documents;
- e. reject any tender submitted by a company which in the opinion of the town 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 tender;

- f. not accept a tender from any person or corporation which includes any non-arms length corporation who, or which, has a claim or instituted a legal proceeding against the Town of Oakville, or against whom the Town of Oakville has a claim or instituted a legal proceeding with respect to any previous contracts, bid submissions or business transactions who is listed as either the proposed general contractor or subcontractor and/or vendor within the submitted responses; and/or
- g. reject any tender submitted by a bidder or cancel the Contract awarded to that bidder without penalty, where any information provided by the bidder in its tender or as part of any pre-qualification procedure is determined to be false or otherwise misleading in any material respect.
- h. In cases where the town is required to obtain permits from governing authorities and those permits are not able to be obtained in a timely manner, the town reserves the right not to award the bid.

1.12.2 Where only one tender has been received or the lowest priced compliant tender submission exceeds the town's budgeted or estimated costs, the town may, but is not obligated to:

- a. cancel the Request for Tender;
- b. re-issue the Request for Tender and accept new tenders based on revised documents; or
- c. enter into negotiations with the bidder with the lowest priced and compliant tender submission provided that the requirements of the tender documentation are not substantially modified, and no other bidder shall have any right to object that its tender would have been lower had the negotiated amendments been included in the original Request for Tender.

1.13 Bribery and Collusion

- 1.13.1 Bidders including any of their agents are prohibited from engaging in any form of political or other lobbying of any kind whatsoever to influence the outcome of the tender process and the town shall be at liberty to reject the bidder's submission or cancel any contract in contravention of this requirement.
- 1.13.2 The bidder further acknowledges that its bid is made without any connection, knowledge, comparison of figures or arrangements with any other firm or person making a bid for the same work and is in all respects fair and without collusion or fraud.

1.14 Conflict of Interest

- 1.14.1 No employee of the town, advisors or members of Council of the town shall personally sell goods or services to the town, nor have a direct or indirect interest in a company that sells goods or services to the town, other than a de minimus passive investment in a publicly issued entity. The town may reject any bid submitted, or cancel any Contract awarded, in contravention of this requirement.
- 1.14.2 The successful bidder shall refrain from acting in any case where there may be any conflict of interest between it (or any of its directors, officers, or employees) and the town, and the successful bidder shall notify the town immediately of any actual or potential conflict of interest that may arise during the performance of the Contract.

1.14.3 It is imperative that any real or perceived conflict that is evident or suspected be declared and adjudicated in order to preserve the integrity of the bid process. If the town discovers a bidder's failure to disclose a conflict of interest, the town may disqualify the bidder or terminate any contract pursuant to this tender process.

1.15 Award Process

- 1.15.1 Following written notification from the town to the successful bidder, the executed Contract, performance surety and all other required documentation will be provided by the successful bidder within ten (10) calendar days or sooner if possible. The form of contract used for this tender shall be CCDC-2 2008 Stipulated Price Contract (Refer to Appendix A for Supplementary Conditions to the CCDC-2-2008 Stipulated Price Contract. A purchase order will be issued with the award and the purchase order number must be included in all requests for payment.
- 1.15.2 Award of the tender will be made by the town as soon as practical. Award may be subject to budget approval and will occur on approval by town officials as designated in the By-law. Once approvals are received from designated officials the award is deemed to have been made by the town.
- 1.15.3 Where quantities are noted as approximate, the town may, at its discretion, purchase more or less of the commodity based on the unit price bid.
- 1.15.4 Only contractors that the town deems as fully qualified will be considered for award of this tender. It is the bidder's responsibility to provide satisfactory references that are relevant to the current project in scope and value. The town will also review the bidder's prior performance on other contracts with the town and when relying on the services of a Consultant in the conduct of the project, the knowledge of that Consultant will also be considered.
- 1.15.5 In the event the successful bidder fails to execute the Contract as prescribed or fails to provide performance surety as applicable within ten (10) calendar days following written notification from the town to the successful bidder, the town may grant additional time to fulfill the necessary requirements, if in the opinion of town staff the extension does not compromise the interests of the town.
- 1.15.6 Where the successful bidder fails to execute the Contract or provide performance surety as set out in Section 1.9, the town shall declare the bid deposit forfeited and the bidder will be held responsible for any increased costs or damages incurred by the town, such amounts being a fair and reasonable estimate of foreseeable losses. The town may then make a recommendation to:
- a. award the contract to the next lowest compliant bidder, or
 - b. cancel the Request for Tenders.

Any bidder who fails to provide all required documents within the timelines provided, or otherwise fails to enter into an agreement with the town upon notice of being the successful bidder may be subject to suspension by the town and prohibited from bidding for a period of up the three (3) years.

1.16 Bid Review Procedures

- 1.16.1 To maintain the integrity of the process, a bidder who believes there has been a breach of the requirements of the Canadian Free Trade Agreement (CFTA), shall take the following steps:
- a. A request by a bidder for a bid review must be received by the Manager of Purchasing within ten (10) business days from the time when the basis of the dispute became known or reasonably should have become known. The request must provide sufficient detail including reference to the specific Article in the CFTA the bidder believes was breached.
 - b. An adhoc review committee consisting of the Manager of Purchasing, the departmental director and the town solicitor or their approved designates shall review such dispute.
 - c. Findings shall be issued to the bidder in writing within 90 days after filing of its dispute, unless an extension of time is warranted due to extenuating circumstances, in which case the findings will be issued within 135 days after the filing of the dispute.
 - d. The town and the bidder shall seek to resolve the dispute through consultations.
 - e. Where a bidder provides an appeal, in writing, to the review committee's initial findings, the town will establish an arbitrator independent of the town to receive and review the appeal.
 - f. If the arbitrator determines that there has been a breach, compensation to the bidder is limited to the costs of the preparation of the bid submission, or the costs relating to the dispute, or both.
 - g. If the town and the bidder cannot agree upon the fair and reasonable amount of such costs defined under item f., their quantum may be referred to the arbitrator for determination. The costs to be borne by the party that is unsuccessful in the dispute.

1.17 MANDATORY SUBMISSION REQUIREMENTS

Bidders shall refer to the instructions attached to the solicitation for the Submission Forms (within the online bidding system) requirements and provide all required information in accordance with the instructions provided in the bidding system.

Each bidder must include the following mandatory Submission Forms and provide all required information:

1. Schedule of Prices
2. Completed Reference Form
3. Completed Subcontractor Form
4. 10% Bid Bond
5. Agreement to bond for 50% Performance and 50% Labour and Materials

SECTION 2 – GENERAL CONDITIONS

2.1 Governing Codes

This Contract shall be subject to any of the following governing codes (latest edition) having jurisdiction over this project, including but not limited to:

- Ontario Building Code
- Fire and Electrical Safety Codes
- Fire Marshal Act
- National Fire Prevention Authority
- Ontario Water Resources Act
- Gas Utilization Code
- Environmental Protection Act
- ESA (Electrical Safety Authority)
- Municipal Bylaws
- Ontario Occupational Health and Safety Regulations

2.2 Owner's Designate

The Project Manager for this project is:
Meghna Chawla, Project Leader, Interiors

The Project Manager shall inspect and oversee all work included and specified herein to the extent of ensuring that specifications are being followed and the quality of work meets the expectations of the town and shall have authority to stop the work whenever such stoppage, in his/her opinion, may be necessary to ensure the proper execution of the Contract. The Project Manager shall also have authority to reject all work and materials which do not conform to the tender specifications or which are viewed as substandard, flawed or in any other way deemed not suitable for the town's purposes, and to answer all questions which arise in the execution of the work. The town reserves the right to change the Project Manager upon written notice to the Contractor.

2.3 Order of Precedence

2.3.1 If there is a conflict within the contract documents, the order of priority of documents, from highest to lowest, shall be as follows (the original copy of the issued document and addendums, as posted in the Bidding System shall prevail).

1. Change Orders and/or Change Directives
2. Executed Agreement Between Owner and Contractor - CCDC-2-2008
3. Contractor's Bid Submission Including Schedule of Prices
4. Addenda (as issued)
5. Special Provisions
6. Supplementary Conditions to Contract CCDC-2-2008
7. Definitions in CCDC-2-2008 Stipulated Price Contract
8. General Conditions in CCDC-2-2008 Stipulated Price Contract
9. Specifications
10. Drawings
11. Tender General Conditions, Instructions to Bidders

2.4 Scope of Work / Specifications / Record Drawings

- 2.4.1 It is the intent of the specifications to furnish and install all materials and equipment as hereinafter specified and/or as shown in the drawings.
- 2.4.2 Work area to be restricted to area shown on drawings.
- 2.4.3 In cases where the work necessitates a larger disturbed area, it shall be the responsibility of the Contractor to notify the Project Manager and receive written approval for extending the area of disruption.
- 2.4.4 The specifications are to be considered as an integral part of the plans, which accompany them; neither the plans nor the specifications shall be used alone. Any item or subject omitted from one, but which is mentioned or reasonably implied in the other, shall be considered as properly and sufficiently specified, and must, therefore be provided. Misinterpretations of either the plans or the specifications shall not relieve the Contractor of their responsibility.
- 2.4.5 Construction drawings and specifications required for this project shall be issued by the Owner's representative at the contractor's request. Any additional drawings such as shop drawings, etc., shall be approved by Owner's representative.
- 2.4.6 All Drawings used on the site or in the shop shall bear the signature of the Owner's representative or "Approved for Construction" stamp of the owner.
- 2.4.7 Additional verbal instructions given by the Owner's representative shall be confirmed in writing and shall become part of this specification. Any such addition shall not alter the intent, limit, quality or quantity of the contract.
- 2.4.8 The Contractor shall be responsible for obtaining a list of the shop drawings required by the Owner.
- 2.4.9 Shop drawings shall be processed by the Contractor according to the manufacturer's requirements.
- 2.4.10 The Owner shall require two (2) copies only, of reviewed drawings as processed by the Contractor unless otherwise directed by the Owner.
- 2.4.11 The Owner will not review the drawings for approval, they shall only be required for the intent of installation and general information, unless otherwise directed by the Owner.
- 2.4.12 All shop drawings received by the Owner shall bear the Contractor's approved or reviewed stamp, and shall be received prior to manufacture of the product.

2.5 Permits, Licenses, Laws and Regulations

- 2.5.1 With the exception of the Building Permit, the Contractor shall apply and pay for all necessary permits and licenses, approvals and consents required for the execution of the Work. The Contractor shall give all necessary notices and pay all fees required by law and comply with all laws, by-laws, rules, regulations, and requirements relating to the work and to the preservation of public health. The Contractor shall be responsible for the safety of all workers and equipment on the site in accordance with all applicable safety legislation passed by Federal, Provincial and Local Authorities governing construction safety.

- 2.5.2 The Contractor shall ensure that all persons supplying services or materials to the Project, Work or Supply hold all valid and current licenses required by law with respect to the services or materials to be supplied by them respectively. Any Contractor who is not a registered entity in Ontario shall obtain all necessary approvals, consents, permits, licences, certificates, registrations, and other authorizations prior to execution of the Contract. The Contractor shall ensure that all Subcontractors the Contractor proposes to use for carrying out any of the Work required by the Contract and who are not a registered entity in Ontario have obtained all necessary approvals, consents, permits, certificates, registrations, and other authorizations prior to execution of the subcontract.
- 2.5.3 The Contractor shall comply with all applicable statutes, law, by-laws, regulations, ordinances, notices, and orders of the Federal, Provincial or municipal government from time to time in effect during the course of the Contract, and where the attention of the Contractor is called to any violation thereof by the town or Consultant, the Contractor shall immediately desist from and remedy that violation.
- 2.5.4 At all times the Contractor and all subcontractors engaged in the Work shall comply with all requirements of the town's Corporate Health and Safety Manual and shall confirm compliance as indicated on the bid form provided. The town's Corporate Health and Safety Manual can be found on our website at:
<http://www.oakville.ca/assets/town%20hall%20-%20employee%20resources/hs-hsmanual.pdf>

2.6 Scheduling and Hours of Work

- 2.6.1 The Contractor and all of its employees are required to identify themselves as the Contractor, or employee of the Contractor, and shall be equipped with sufficient identification for that purpose.
- 2.6.2 The estimated starting date for this project is **April 30, 2024**. The successful bidder agrees to start the work on this project within seven (7) calendar days from the receipt of written notification from the town that construction can start. Start of construction may be dependent upon the receipt of final approvals from various agencies and ministries.
- 2.6.3 The successful bidder shall substantially complete this project to the satisfaction of the Project Manager by **July 31, 2024**.
- The term of the agreement will be in effect until the completion of the Deliverables.
- 2.6.4 In accordance with the town's Noise By-law 2008-098, Schedule 2, the Contractor shall not carry out operations under this contract:
- after 7:00 p.m. or before 7:00 a.m. Monday to Saturday, and
 - all day Sunday and Statutory Holidays.
- If the Contractor wishes to perform work on Saturdays between 7:00 a.m. and 7:00 p.m., they may do so with the written permission of the Project Manager, some restrictions may apply.
- 2.6.5 The Project Manager may, in writing, require the Contractor to cease operations on any day or days if the work is so located that the Project Manger deems it expedient to do so.

2.7 Code of Conduct and Behaviour

- 2.7.1 Each of the parties agrees to act in a manner that is consistent with the Town's Policy HR-MNG-006 – Employee Code of Conduct and Policy G-GEN-006 – Code of Conduct for Members of Council and Local Board Members in their business dealings with the other. These policies can be found on the Town's website at: <http://oakville.ca/townhall/policies-procedures.html>.
- 2.7.2 The Town of Oakville is committed to maintaining a healthy, safe and supportive workplace for all employees that is free from discrimination and harassment. All employees are to be treated with respect and dignity in keeping with the town's values of accountability, dedication, honesty, innovation, respect and teamwork. The policy applies to all town employees (including but not limited to full-time, part-time, students, volunteers, temporary and interns), councillors, contractors, consultants, workers and every person accessing town property, services, events and programs. Each of the parties agrees to act in a manner that is consistent with the Town's Policy HR-MNG-008 - Respectful Conduct, including the associated procedures. These policies and procedures can be found on the Town's website at: <http://oakville.ca/townhall/policies-procedures.html>.

2.8 Accessibility

- 2.8.1 The Town of Oakville is committed to providing accessible programs, services and facilities to help achieve the town's vision to be the most livable town in Canada and to comply with the Accessibility for Ontarians with Disabilities Act, 2005 (AODA). The goal of the AODA is to make Ontario accessible to people with disabilities by 2025. As required under the AODA, each time the town purchases goods, services and facilities it must incorporate accessibility design, criteria and features unless not practicable to do so.
- 2.8.2 The Act also requires persons who provide goods, services or facilities on behalf of the Town of Oakville to ensure training on the AODA's Integrated Accessibility Standard Regulation and the *Human Rights Code* as they pertain to persons with disabilities.
- 2.8.3 To comply, all suppliers and contractors must provide training in accordance with the legislation to all its employees and must be able to provide proof that training has occurred. By signing the Bid Form, you certify that your firm is compliant and you are able to provide proof of training upon request.

The Province of Ontario has developed training that can be taken online and its website provides convenient tools to ensure your employees are properly trained. The Town of Oakville has also developed training materials which can be found on the town's website at <http://www.oakville.ca/business/tenders-quotes.html>.

- 2.8.4 The Town of Oakville is committed to providing accessible facilities, programs and services and to be the most livable town in Canada. The Oakville Universal Design Standards (OUDS) was developed to help staff realize this commitment and provides an innovative and detailed approach for the design of barrier free and accessible facilities. A made-for Oakville standard, it replaces the town's 2008 Guidelines for the Design of Accessible Facilities and its use is mandatory for all construction projects at town owned facilities or leased premises and includes new construction, additions, renovations and capital replacement.

2.9 Sustainable Purchasing

- 2.9.1 The procurement needs of the town represent a significant level of responsibility to demonstrate leadership and support for greener business practices. Integrating environmental performance and impact into supply chain decisions is a commitment to improvement of the environment and the quality of life of town residents.
- 2.9.2 Green procurement shall be viewed in the context of achieving value for money for the total life-cycle costs. It requires the inclusion of environmental impact considerations into the procurement process, including planning, acquisition, use and disposal. Value for money shall include the consideration of many environmental tangible and intangible factors when determining the total life-cycle costs and environmental impact.
- 2.9.3 For further information about sustainable purchasing initiatives visit the town's website: <http://www.oakville.ca/townhall/en-gen-001.html>

2.10 Environmental Protection Act

- 2.10.1 No persons shall use any facilities or equipment for the storage, handling, treatment, collection, transportation, processing or disposal of waste that is not part of a waste management system for which a certificate of approval has been issued and accept in accordance with the terms and conditions of such certificate in compliance with the provisions of the EPA and its Regulations. The persons or corporation shall advise the town of any spills in accordance with the Spills Response Program required under the EPA.

2.11 Extent of Work

- 2.11.1 The work to be performed under these specifications shall include the supply of all labour, transport, material services, and equipment necessary, and required to construct the following work as described by; or reasonably inferable from these specifications.
- 2.11.2 Work area to be restricted to area shown on drawings.
- 2.11.3 In cases where the work necessitates a larger disturbed area, it shall be the responsibility of the Contractor to notify the Project Manager and receive written approval for extending the area of disruption.

2.12 Materials

- 2.12.1 The contractor shall be responsible for the supply of all materials required for the complete construction of the work as described herein and specified on the drawings unless otherwise specifically stated in writing.
- 2.12.2 All materials are to be delivered to the site and stored in appropriate locations with manufacturer or distributor's label intact; handled and stored in accordance with manufacturer's requirements.
- 2.12.3 All materials to be used in the work are to be new without defects. Failure of adherence or failure to comply with specifications requirements shall cause rejection of materials or replacement of same, at contractor's expense.

2.13 Site

- 2.13.1 The Contractor is responsible for damage caused to surrounding facilities, and for the protection of the public. Facilities and/or surroundings damaged by the Contractor shall be repaired and paid for in full by the Contractor at no cost to the town.
- 2.13.2 Prior to commencing any excavation work, the contractor shall establish as near as possible, the location and state of use of all utilities or services, and is responsible for damage or relocation incurred during the execution of the project.
- 2.13.3 The setting out of work shall rest solely with the Contractor who will be responsible for the same. It is the Contractor's responsibility to verify all grades, lines, levels, and dimensions as indicated on the drawings and report any errors or discrepancies to the Project Manager before the commencement of work.
- 2.13.4 The Contractor shall stockpile his materials in areas approved by the Project Manager. Perishable, stainable or damageable products shall be placed above grade and adequately protected from the elements of nature.
- 2.13.5 It shall be the responsibility of the Contractor to provide temporary services, i.e., hydro, water and heat.
- 2.13.6 The Town will "NOT" permit the lighting of fires on any project; all waste must be removed from the site.

2.14 Commencement and Completion

- 2.14.1 The Contractor shall commence work no later than seven (7) days from contract execution date or as otherwise directed by the Project Manager. The work shall be completed according to the plans and specifications, within the time limit as established in these documents.

2.15 Assignment of Contract

- 2.15.1 The Contractor shall not assign the whole or any part of the resulting contract without the prior written consent of the Project Manager.

2.16 Subcontractors

- 2.16.1 The subcontractor form included within the Bidding System must be completed in full. If the contractor is not carrying subcontractors, check "**own forces**" on the form. Only those subcontractors listed on the form will be permitted to work on site unless approval in writing is obtained from the Project Manager. If this form is not completed as noted, the bid may be disqualified. The town reserves the right to reject any subcontractor so nominated.
- 2.16.2 The Contractor agrees to preserve and protect the rights of the parties under the Contract with respect to work performed under subcontract, and shall enter into contracts or written agreements with their subcontractors to require them to perform their work in accordance with and subject to, the terms and conditions of the contract. Further, the Contractor shall be fully responsible to the town for acts and omissions of their subcontractors and for any persons directly or indirectly employed by them.
- 2.16.3 The bidder certifies that all workers and subcontractors have received proper training and carry required certifications as necessary by law in the Province of Ontario.

- 2.16.4 Changes made to the list of nominated subcontractors after the closing of the tender, shall have prior written approval of the town's Project Manager.

2.17 Changes

- 2.17.1 No change in the work shall proceed without the written approval of the town's Project Manager.

2.18 Performance Evaluation

- 2.18.1 At project completion, the Project Manager will conduct an evaluation of the contractor's overall performance with input from the town's Inspectors or consultants, if applicable. Recommendations will be put forward as to the contractors overall suitability for future Town of Oakville work. It must also be noted that while overall performance is being evaluated, the Town reserves the right to suspend a bidder for continued and/or repeated inadequate performance on any issues.
- 2.18.2 Vendor performance is governed by the town's Procurement Policy By-law – Section 11 – Supplier Performance Evaluation and the Supplier Performance Program. Both of these documents are available on the Town of Oakville website at:

<http://www.oakville.ca/business/tenders-quotes.html>

2.19 Non-Performance / Contractor's Default

- 2.19.1 In the event the Contractor does not comply with the specifications, terms and conditions of the Contract, or other such act of non-performance, the town shall advise the Contractor to correct such non-performance issue within such period of time as stated.
- 2.19.2 If the Contractor fails to remedy the non-performance issue after being instructed to do so, the town may issue final written notice or terminate the Contract and take corrective action itself.
- 2.19.3 Where an act or event of default by the Contractor occurs, the town may terminate the Contract by giving written notice to that effect. Alternatively, the town may hold back any amount payable (on this or any other contract with the town) as in the opinion of the town is reasonably required to secure timely completion of the work.

Acts or events of default by the Contractor may include but not be limited to the following:

- a. The Contractor fails or neglects to commence or to proceed with the Project, Work or Supply diligently and at a rate of progress that in the opinion of the town will ensure entire completion within the time provided for in the contract documents.
- b. The town determines reasonably that the Contractor has abandoned the work, the determination of which the town shall be the sole judge.
- c. The Contractor is adjudged bankrupt or becomes insolvent, or a petition in bankruptcy is filed against the Contractor, or where the Contractor makes an assignment for the general benefit of creditors or applies for relief under the Companies' Creditors Arrangement Act, or where proceedings of any type are instituted in any jurisdiction in respect of the alleged insolvency or bankruptcy of the Contractor.

- d. Where any formal or informal proceeding for the dissolution of, liquidation of, or winding up of, the affairs of the Contractor is instituted by or against the Contractor, or where a resolution is passed or any other act undertaken for the winding up of the Contractor.
- e. The Contractor ceases or threatens to cease to carry on its business, or the Contractor makes or agrees to make a bulk sale of its assets.
- f. A receiver, manager or trustee is appointed in respect of the business or assets of the Contractor, or any part of thereof, by a court of competent jurisdiction, or under an agreement.
- g. The Contractor defaults in payment of any indebtedness or liability to a bank or other lending institution, or an approved subcontractor or supplier whether secured or not.
- h. The Contractor defaults in the completion of the work or the Contractor fails or refuses to remedy any unsatisfactory or defective work or to remove any unsatisfactory or condemned material when so ordered by the town in writing.
- i. The Contractor persists in any course in violation of any of the provisions of the contract documents after receiving written notice from the town to correct that violation.

Termination may occur subsequent to the town providing notification pursuant to s. 2.19.1 or s. 2.19.2, or may be immediate without notice under either s. 2.19.1 or s. 2.19.2 depending on the severity of the default.

- 2.19.4 The remedies provided in this section are in addition to all other legal, equitable or statutory remedies to which the town is otherwise entitled, and the taking of any one remedy shall not preclude the taking of any other remedy.
- 2.19.5 Where there is a default by the Contractor under the contract, the town may waive that default by written notice to that effect. A waiver of a default shall not extend to, or be taken in any manner whatsoever to affect the rights of the town with respect to any subsequent default, whether similar or not. The failure of the town to insist on strict performance on any provisions of the Contract shall not be construed as a waiver or relinquishment of the right to insist upon strict performance of such provisions on any future occasion.

2.20 Restoration

- 2.20.1 At all times, the Contractor shall keep the site free from accumulations of debris and in orderly condition during construction. Upon completion of each stage of work, remove from the site all equipment, surplus materials and waste resulting from such work.
- 2.20.2 It is the responsibility of the Contractor to restore the site to its original condition to the satisfaction of the owner after work has been completed. All surplus material and garbage of every description, incidental to the work, shall be cleared leaving the project neat and orderly.

2.21 Inspection

- 2.21.1 Inspection shall be carried out by the Project Manager, and the Contractor shall be responsible for notifying the same at least forty-eight (48) hours prior to the proposed inspection, confirmed in writing by the Contractor.

The owner's representative has the right to accept or reject any work and/or materials to be used in the work that he deems to be in the best interests of the town.

2.22 Substantial Performance Publication

2.22.1 The contractor shall publish a copy of the Certification of Substantial Performance of the contract once in a Construction Trade newspaper within seven (7) days of receiving a copy of the Certificate signed by the payment certifier in accordance with the Construction Act, R.S.O. 1990, c. C.30, as amended. Where the bidder fails or refuses to publish the Certificate within twenty (20) days of the date of the Certificate, the Owner may publish a copy of the Certificate in a Construction Trade newspaper and deduct the cost thereof from the amount payable under the contract.

2.23 Application for Payment

2.23.1 Application for payment as the job progresses shall be arranged with the Project Manager.

2.23.2 The town reserves the right to request further evidence of breakdown or documentation to establish a fair and reasonable evaluation of the application. Should such information be required, the receipt date of application shall be adjusted accordingly.

2.23.3 All payments shall be made by the town within twenty eight days (28) days of the official receipt of a "Proper" invoice. The Proper invoices shall contain the following information, and shall meet any other requirements that the contract and tender document specifies:

- Invoice number;
- The contractor's name and address;
- The date and period during which the services or materials were supplied;
- Information identifying the authority, whether in the contract or otherwise, under which the services or materials were supplied;
- A description, including quantity where appropriate, of the services or materials that were supplied;
- The amount payable for the services or materials that were supplied, and the payment terms;
- Schedule of Values;
- The name, title, telephone number, and mailing address of the person to whom payment is to be sent;
- the Purchase Order number issued for the project;
- Any other information that may be prescribed (no additional information is currently prescribed);
- Current Workplace Safety & Insurance Board (WSIB) certificate; and
- Current Statutory declaration.

Where the contractor fails to provide a proper invoice, a notice of non-payment shall be delivered to the contractor within fourteen (14) days and where a contractor submits a proper invoice, the Town has a right to dispute all or parts of the invoice; and shall deliver a notice of non-payment within fourteen (14) days of receiving the proper invoice for disputed amounts.

2.23.4 If the contract requires the submission of invoices for payment, all invoices must show the Purchase Order number issued for the project. Prior to invoicing for work, the town's Project Manager or Designate must provide approval for all amounts to be invoiced. If invoices for payment are received by the town without a purchase order number or without prior approval of the Project Manager, the invoice will not be paid.

and will be returned to the contractor. Continued incidence of non-compliance to this provision will be reflected in the performance evaluation and may affect the ability to work for the town in future.

- 2.23.5 Invoices shall be submitted in PDF or TIF format to the following email address; **accountspayable@oakville.ca**. Unless otherwise specified, terms are to be NET 28 Days. It is the policy of the town that application by a vendor for penalty charges for late payment will not be allowed.

2.24 Progress Certificate Payments (where applicable)

- 2.24.1 Once per month, the contractor and the Project Manager or Designate shall agree on the approximate amount of work done and material furnished and the value thereof according to the terms of the contract. The date of this determination shall be known as the "measurement date". Failing agreement on amount of work done the decision of the Project Manager or Designate shall govern.
- 2.24.2 A progress certificate shall be prepared by the Project Manager or Designate based on the work completed on each measurement date and shall be of the amount, quantity and value of the work done since the contractor commenced the performance of this contract less all stipulated forfeitures and deductions.
- 2.24.3 The Owner will pay to the contractor eighty eight percent (88%) of the amount shown on all such certificates in accordance with the terms and conditions of the Construction Act (unless another form of holdback is negotiated at the time of contract award), and only upon receipt of a Certificate of Clearance from the Workplace Safety & Insurance Board and a Statutory Declaration stating that all subcontractors and suppliers have been paid all amounts due and payable to them as at the measurement date. These payments will be made on Progress Certificates, which shall be approximate only and must not be taken or construed as an acceptance of the work so estimated or as an admission that the Owner is in any way liable to the contractor in respect thereof.
- 2.24.4 The 10% holdback will be dealt with as per the terms and conditions of the Construction Act, R.S.O. 1990, c. C.30, as amended. The remaining 2% will be released subject to rectification of all maintenance deficiencies after the expiration of the maintenance warranty. The maintenance warranty period will expire twelve (12) months following the issuance of the completion certificate.

2.25 Final Payment and Release of Holdbacks

- 2.25.1 Final payment and release of holdback shall be released only when the following documentation, as applicable, has been received from the Contractor:
- Waiver of Lien
 - Certificate of Clearance from the Workplace Safety & Insurance Board
 - Certificates of Guarantees
 - Manuals if Specified
 - Record Drawings
- 2.25.2 Subsequent release of 10% holdback shall be made only when the following documentation, as applicable, has been received from the Contractor:
- Statutory Declaration certifying that all suppliers and trades have been paid in full
 - Certificate of Clearance from the Workplace Safety & Insurance Board
 - Mandatory Construction Lien Act Advertisement

2.25.3 Subsequent release of the 2% holdback shall be made only when the one-year warranty period has expired and there are no outstanding maintenance issues.

2.26 Changes in Government Taxes

2.26.1 Where a change in Canadian Federal or Provincial Taxes occurs after the Tender Closing date for this contract, and this change could not have been anticipated at the time of bidding, the Owner will increase or decrease contract payments to account for the exact amount of change involved. Claims for compensation for additional tax costs shall be submitted within thirty (30) days after the date of acceptance of the work.

2.26.2 Where the contractor benefits from a change in Canadian Federal or Provincial Government taxes, the contractor shall submit to the Project Manager or Designate, a statement of such benefits. This statement shall be submitted not later than thirty (30) days after the date of acceptance of the work.

2.27 Liens

2.27.1 In the event that a construction lien is registered against the Project by or through a Subcontractor or Supplier, the Contractor shall, at its own expense:

- i. within ten (10) Working Days, ensure that any and all construction liens and certificates of action are discharged, released or vacated by the posting of security; and
- ii. in the case of written notices of lien, ensure that such notices are withdrawn, in writing.

2.27.2 In the event that the Contractor fails to conform with the requirements of 2.27.1, the Owner may set off and deduct from any amount owing to the Contractor, all costs and associated expenses, including the costs of borrowing the appropriate cash, letter of credit or bond as security and legal fees and disbursements. If there is no amount owing by the Owner to the Contractor, then the Contractor shall reimburse the Owner for all of the said costs and associated expenses.

2.27.3 Subcontractors, Suppliers and 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 and which have been identified to the party or parties, from whom payment has been withheld.

2.28 Warranty / Guarantee

2.28.1 The Contractor shall guarantee the quality of workmanship and materials for a period of twelve (12) months from the date of acceptance, and make any repairs or replacements as required by the town.

2.28.2 The Contractor agrees to correct promptly, at his own expense, defects or deficiencies in the work which appear prior to and during the period of twelve (12) months from the date of substantial performance of the work or such longer periods as may be specified for certain products or work.

- 2.28.3 If after seven (7) days' notice, the Contractor fails to carry out any repairs as directed by the town, the town may proceed with such and charge the same against any monies that are outstanding to the Contractor. If no monies are being held by the town, the town reserves the right to bill such repairs back to the Contractor or to make a claim against performance security that is being held for the work in question.
- 2.28.4 The Contractor agrees to correct or pay for damage resulting from corrections made under the requirements of the warranty.
- 2.28.5 The decision of the town shall be final as to the nature and imperfection of guaranteed work, and the necessary remedy of same.

SECTION 3: LIABILITY & INSURANCE REQUIREMENTS

3.1 Agreement with Terms

- 3.1.1 By submitting a bid the bidder agrees to all the terms and conditions of this Request for Tender and this document or any portion thereof, may not be used for any purpose other than the submission of bids.

3.2 Laws of Ontario

- 3.2.1 Any Contract resulting from this Request for Tender will be governed by and will be construed and interpreted in accordance with the laws of the Province of Ontario. The successful bidder shall abide by all relevant provisions of the Canada Labour Code and the Employment Standards Act of Ontario, as amended.
- 3.2.2 Any bidder awarded a contract must comply with the regulations of Ontario Regulations 213/91 as amended for construction projects, Part 1 Registration and Notices, Sections 5-7 where this regulation is applicable to this project.

3.3 Liability for Errors

- 3.3.1 While the town has used considerable efforts to ensure an accurate representation of information in this Request for Tender, the information contained in this Request for Tender is supplied solely as a guideline for bidders. The information is not guaranteed or warranted to be accurate by the town, nor is it necessarily comprehensive or exhaustive. Nothing in this Request for Tender is intended to relieve bidders from forming their own opinions and conclusions with respect to the matters addressed in this Request for Tender.

3.4 Insurance

- 3.4.1 Upon award and prior to signing of any Contract documents (including the issuance of a purchase order), the successful bidder shall obtain and maintain at its own expense, including the cost of any applicable deductible, the following policies of insurance:

Commercial General Liability Insurance, written on IBC Form 2100 or its equivalent, including but not limited to bodily injury and personal injury liability, property damage, products liability, completed operations liability, owners & contractors protective liability, blanket contractual liability, premises liability, broad form property damage, employer's liability and voluntary compensation and contingent employer's liability coverage, having an inclusive limit of not less than **\$5,000,000** per occurrence. Policy shall be endorsed to show the Town of Oakville as additional insured.

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 \$2,000,000 per occurrence; for Third Party Liability, in respect of the use or operation of vehicles owned, operated or leased by the successful bidder for the provision of services.

Non-Owned Automobile Liability Insurance in standard form having an inclusive limit of not less than \$2,000,000 per occurrence in respect of vehicles not owned by the bidder, that are used or operated on its behalf for the provision of services under the Contract;

- 3.4.2 This policy may be subject to the approval of the Town Solicitor and shall be kept in full force through the term of the contract and until the date of acceptance and maintenance period of the entire Work.
- 3.4.3 WSIB Certificate: The Town of Oakville requires all Contractors be in full compliance with all requirements imposed upon them by the Workplace Safety Insurance Board. All certificates of training and Safety Policies and Manuals must be available for presentation upon request.
- 3.4.4 At time of award and prior to release of each and every progress draw, the successful bidder will be required to provide a WSIB Certificate to the town. Such certificates shall indicate that the Contractor and any subcontractors have complied with the requirements of the Workplace Safety & Insurance Board and are in good standing with the Board.

3.5 Workplace Hazardous Materials Information System WHMIS

- 3.5.1 No hazardous material is to be stored or used on the town property by the contractor unless the prescribed requirements concerning labeling material safety data sheets (MSDS) and worker instruction and training are met.

3.6 Indemnification

- 3.6.1 The successful bidder, its agents, all workmen and persons employed by it, or under its control, will use due care that no person or persons are injured and that no property is damaged in the prosecution of the work and the successful bidder will be solely responsible for all damages to person or property, including theft, whether the property is owned by the town or any of its employees.
- 3.6.2 Each bidder and the successful bidder shall defend, indemnify and save harmless the town, its officers, agents and employees from any and all claims, demands, suits, actions or proceedings of any kind or nature whatsoever, including Workers' Compensation claims, in any way resulting from or arising out of this contract; provided, however, that the bidder need not indemnify or save harmless the town, its officers, agents and employees from damages resulting from the sole negligence of the town's officers, agents and employees.

SECTION 4:

SCOPE OF WORK / SPECIFICATIONS

4.1 Background and Scope

2009, design and construction of a new facility started at 430 Wycroft Road and in the summer of 2011 opened to the public. The facility is LEED Silver Certified, approximately 270,000 sq. ft., which houses, Administration Services, Bus Operations, Parking Control, Service Lanes, Maintenance and Storage and Municipal Enforcement Services (MES).

Currently the MES staff are housed at two locations, the Oakville Transit facility and Town Hall. For better communication and collaboration between the team members an ongoing need surfaces to accommodate the MES staff at a single location thereby leading to the need to renovate and expand the current MES space at the Transit facility to accommodate the additional MES staff currently housed at Town Hall.

The Town of Oakville (the Town) is seeking the services of a qualified General contractor to renovate the existing MES space at Transit facility. The General Contractor's team will include all sub-contractors required to provide the deliverables described in the RFT.

For the detailed scope of work refer to the IFT Drawings and Specifications.

4.2 Other Submittals Upon Award

- a) Preliminary construction schedule.
- b) Health and Safety Policy.
- c) Contractor to provide their own preliminary security fencing and site hoarding plan, including the location of the temporary washrooms, parking, and loading, to Owner and Consultant for approval prior to construction.

4.2 General

No material storage will be allowed outside of hoarding. Contractor to ensure that all material storage stays within the hoarded area and that areas outside of hoarding are maintained safe and clear of debris, material, and dirt to ensure public and staff safety.

Contractor shall ensure that all surfaces noted as to remain are protected for the duration of construction.

Contractor to provide intermittent /as necessary cleaning during all phases to ensure customer and staff safety. All operational areas to be kept free of dirt and debris. Contractor to include a final, major cleaning of the entire affected area prior to handover.

Contractor to review DSS Report (supplied by Owner under separate cover).

Contractor is responsible to coordinate with the Owner / PM, as necessary to complete this project. This will require the successful contractor to:

- a) Attend a preconstruction meeting with the Owner to review and verify:
 - i. Exact area of work, dimensions and site location.
 - ii. Review and finalize this project-specific health and safety plans to ensure ongoing regular monitoring of compliance with the OHS regulations.
 - iii. Review and finalize the security fencing and site hoarding plan, including the location of the temporary washrooms, parking, and loading prior to mobilizing on-site and start of construction, as applicable.
 - iv. Provide worker certifications and health and safety training records for all workers performing the work on site for all divisions of work, for the contractor, subcontractors, suppliers and vendors, where applicable.
 - v. Confirm the maintenance program in place to ensure ongoing worker certifications and health and safety training records are maintained current throughout the performance of the contract.

- b) Division and the coordination of the Work among other contractors, subcontractors, suppliers or vendors is solely the Contractor's responsibility. Neither the Owner nor Consultant assumes any responsibility to act as an arbiter to establish subcontract terms or disagreements between sectors or disciplines of the Work.

2MK Architects Inc.

3461 Dixie Road, Mississauga, unit #504

On. L4Y 3X4

MES – TRANSIT BUILDING RENOVATIONS

Address: 430 Wycroft Road, Oakville, Ontario, L6K 2G7

SPECIFICATIONS BOOK

ISSUED FOR TENDER FEBRUARY 26th. 2024

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PART 1 GENERAL

1.1 Related Work

1. All sections of Division 1 within these specifications apply to all sections of Work of this contract.

1.2 Contract Method

1. Construct the Work indicated in the Tender drawings, Contractor to provide itemized pricing as per Town of Oakville Bid Form.
2. Owner/Client Mandated Subtrades:
 1. General: Contractor shall use one of the mandated trades for the specific scope of work/
 - A) Owner Mandated Contractors to be selected from list below:
 1. Access Controls:
 - a. 360 ASC
Contact name: Christopher Phillips
Work: (416) 798-2228
Mobile: (647) 223-5570
Email: Christopher.P@360asc.com
 2. Fire Controls:
 - a Hamilton Fire Control
Contact name: Frank Tracey
Work: (905) 527-7042
Mobile: (289) 339-7598
Email: hfc@cogeco.ca
 3. HVAC Controls/BMS:
 - a. Johnson Controls
Contact name: Iain.D.Hill@jci.com
 4. WORK BY OWNER: The Owner has awarded contracts or will execute using own forces, for supply and installation of the following work, during the execution of the Work.
 1. IT wiring and equipment
 2. Wireless Access Point (WAP)
 3. Furniture
 - B) Contractor Responsibilities:
 1. Provide support systems to receive Owner's work, as well as plumbing, HVAC, and electrical connections.
 2. Be present for delivery and assist the Owner's inspection.
 3. Use Owner furnished delivery dates in Contractor's Construction Schedule.
 4. Review submittals for coordination and compatibility with Work. Notify Consultant of discrepancies or anticipated problems regarding incorporation of the Owner's work.
 5. Make provisions for receiving, unloading, handling, storing Owner furnished items at Project Site.
 6. .Make provisions for storage and protecting items from damage

3. OWNER-SUPPLIED PRODUCTS:

- A) General: Owner will supply pre-purchase materials and equipment to be incorporated into and during the Work. Include costs for receiving, handling, storage if required, and installation of material and equipment in the Contract Sum, unless otherwise indicated.
- B) Owner Supplied Products to include:
 - 1. *1 Key Management System -1*
 - 2. *TV screens – 5 in number*
- C) Obtain the necessary shop drawings for the product and proceed to coordinate details for installation, expedite, receive, unload, install, connect and test the specified equipment, and be responsible for warranty.
- D) Specifications for pre-purchased items are included in the project specification, information only.
- E) Receive Owner-supplied Products and equipment F.O.B. and store and process

4. Contractor Responsibilities:

- A) Design Submittals and delivery date for each product in progress schedule
- B) Review shop drawings, product data, samples, and other submittals. Submit to Consultant, notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
- C) Receive and unload Products at site.
- D) Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.
- E) Handle Products at site, including uncrating and storage.
- F) Protect Products from damage, and from exposure to elements.
- G) Assemble, install, connect, adjust, and finish Products.
- H) Arrange for installation inspections required by public authorities.
- I) Repair or replace items damaged by Contractor or Subcontractor on site (under their control).

1.3 Work Sequence & Construction Progress Schedule

- 1. Construct Work in one phase ensuring continuous, uninterrupted progress from Start through to Final Completion, within the project schedule approved by the Town. Work expected to start mid of April 2024, and completed by end of June 2024.
- 2. Meet with Owner and Consultant within five (5) working days of Contract award, to discuss proposed approach for undertaking the Work, inclusive of methodology, sequencing, Construction Equipment, and labour resources to be utilized.
- 3. Submit a preliminary as-planned schedule as indicated in Section 01 32 16 Construction Progress Schedule, within fifteen (15) working days after Contract award.
- 4. Once preliminary as-planned schedule is approved and the final as-planned schedule is created, record "progress to date" on a copy of schedule to be available at the Site. Inspect Work with the Owner and the Contract administrator at least bi-weekly to establish progress on each current activity.

5. The Contractor's schedule is to be updated and resubmitted to the Consultant as a progress schedule at least once per month, on a date to be mutually agreed by the Contractor and the Consultant.
6. This building is currently operational and will remain fully operational during construction. Contractor to ensure that safe entry and exiting from the building is maintained at all times throughout construction. As well, contractor to ensure interior operations and employee/visitor safety is maintained throughout all phases of the project construction.
7. Security fencing / site hoarding to be provided by Contractor within the base bid. Preliminary hoarding plan is included in the contract documents for reference. Upon award, contractor to provide their own hoarding plan to Owner and Consultant for approval prior to construction.
8. No material storage will be allowed outside of hoarding. Contractor to ensure that all material storage stays within the hoarded area and that areas outside of hoarding are
9. maintained safe and clear of debris, material, and dirt in order to ensure public safety.
10. Contractor's hoarding plan to identify location of temporary washrooms for Contractor use. Contractor's base bid to cover costs associated with temporary washrooms.
11. Contractor shall ensure that all surfaces noted as to remain are protected for the duration of construction.
12. Contractor to review DSS Report (supplied by Owner under separate cover). This report forms part of the project and Contractor shall be responsible to comply with all recommendations/conditions and account for such work in the base bid.

1.4 Description of work

1. Work of this contract complies of renovations to the existing space of the "maintenance shop" of the MES building & other renovations to parts of the adjacent offices space in the main floor & second/mezzanine floor as indicated & specified in the Tender drawings of this project.
2. Responsibilities of the Contractor:
 1. Designate submittals and delivery date for each product in progress schedule.
 2. Facilitate and pay for utility locates.
 3. Receive and unload products at site.
 4. Inspect deliveries, if requested, record shortages, and damaged or defective items.
 5. Handle products at site, including uncrating and storage.
 6. Protect products from damage, and from exposure to elements.
 7. Maintain existing building demising walls, fire separations, all exterior walls & windows from any damage, repair and make good any damage resulting from construction & bring it to acceptable building Code status.
 8. Carry on demolition as marked in the demolition drawings & documents.
 9. Assemble, install, connect, adjust, and finish products.
 10. Construction of renovation scope of work as indicated in the drawings & documents
 11. Provide installation inspections required by public authorities.
 12. Repair or replace items damaged by Contractor or his Subcontractors on site.
 13. Arrange and pay for delivery to site in accordance with Progress Schedule.
 14. Arrange for replacement of damaged, defective, or missing items.

15. Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties to the Contract administrator in accordance with Section 01780 - Closeout Submittals.
16. Facilitate and pay for testing.
17. Pickup items supplied by The Town as they become available. All items may not be available for pickup at the same time. The Town Representative shall coordinate this as items are needed on site.

1.5 Standards and Codes

1. Contract forms, codes, specifications, standards, manuals and installation, application and maintenance instructions referred to in these specifications, unless otherwise specified, amended or date suffixed, shall be latest published editions at Contract date.

1.6 Laws, Notices, Permits and Fees

1. Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Place of the Work. Codes and regulations form an integral part of the Contract Documents.
2. Permits
 1. The Contractor shall obtain and pay for all permits, licenses, deposits and certificates of inspection as part of the Work, including permits for road closures.
3. Arrange for inspection, testing and acceptance of the Work required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay costs.
4. It is the responsibility of the Contractor to schedule notifications and inspections required by authorities having jurisdiction, such that notifications can be properly received and that inspections can be properly undertaken without causing a delay in the Work. The Contractor, at no additional cost to the Owner, shall be solely responsible for any delay in the Work caused by failure to properly schedule required notifications and inspections.

1.7 Discrepancies and Clarifications

1. Advise Consultant of discrepancies discovered in requirements of the Contract Documents and request clarification from Consultant in written form.
2. Advise Consultant when clarifications are required pertaining to meaning or intent or requirements of Contract Documents and request clarification from Consultant in written form.
3. Do not proceed with related work until written clarification is provided by Consultant.
4. Failure to notify Consultant shall result in Contractor incurring responsibility for resulting deficiencies and expense at no additional cost to the Owner.
5. Written instructions issued by Consultant for the purpose of clarification, implicitly supersede applicable and relevant aspects of the Contract Documents irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification instructions.

1.8 Site Progress Records

1. Maintain at site a permanent written record of progress of work. Make the record available at all times with copies provided when requested. Include in record each day:
 1. Commencement and completion dates of the work of each trade in each area of Project.
 2. Attendance of Contractor's and Subcontractor's work forces at Project and a record of the work they perform.
 3. Dates, status and particulars of submissions, i.e. shop drawings, samples, mockups and the like.
 4. Dates, status and particulars of deliveries, i.e. manufacturing dates, delivery and installation dates.
 5. Visits to site by Owner, Consultant, authorities having jurisdiction, testing companies, Contractor, Subcontractors, and suppliers.
- F) Maintain a progress chart in approved format. Show on chart proposed work schedule and progress of work by Contractor and Subcontractor. The status of delivery items, ie. Shop drawings status, manufacture dates - delivery and installation dates.

1.9 Documents at the Place of the Work

1. Maintain at the Place of the Work, one copy of each of following:
 1. Contract Documents including drawings, specifications, addenda, and other modifications to the Contract, including copies of standards and codes referenced in the Contract Documents.
 2. 'Reviewed' or 'Reviewed as Modified' shop drawings.
 3. Construction, inspection and testing, and submittal schedules.
 4. Supplemental Instructions, proposed Change Orders, Change Orders, and Change Directives.
 5. Field Test Reports.
 6. Consultant's field review reports and deficiency reports.
 7. Reports by authorities having jurisdiction.
 8. Building and other applicable permits, and related permit documents.
 9. Daily log of the Work.
 10. As-built drawings recording as-built conditions, instructions, changes, and the like, as called for in Section 01 33 00, prior to being concealed.
2. Make above material available to Consultant upon request.

1.10 Examination

1. Examine site, and ensure that each Section performing work related to site conditions has examined it, so that all are fully informed on all particulars which affect the Project Work (thereon and at the place of the building, and in order that construction proceeds competently and expeditiously).

2. Ensure by examination that all physical features at the work, and working restrictions and limitations which exist are known, so that the Owner is not restricted in his use of the premises for his needs.
3. Examine designated substance report furnished and site, identify and document hazardous materials that will be disturb. Provide report to Consultant & Owner.
4. Conduct geophysical investigation of the exterior areas affected by the work and locate all buried and underground features prior to commencement of work. Document and provide report to Consultant.
5. Examine record drawings available from previously completed work and document any discrepancies and notify consultant. Request record drawings from Owner.
6. Previously Completed Work:
 - a. Where dimensions are required for proper fabrication, verify dimensions of completed work in place before fabrication and installation of work to be incorporated with it.
 - b. Verify that previously executed work and surfaces are satisfactory for installation or application, or both, and that performance of subsequent work will not be adversely affected.
 - c. Ensure that work installed in an unsatisfactory manner is rectified by those responsible for its installation before further work proceeds.
 - d. Commencement of work will constitute acceptance of site conditions and previously executed work as satisfactory.
 - e. Defective work resulting from application to, or installation on, or incorporation with, unsatisfactory previous work will be considered the responsibility of those performing the later work.
7. Construction Measurements:
 - a. Take site dimensions of completed work before installation of work to be incorporated commences.
 - b. Before commencing installation of work, verify that its layout is accurately in accordance with intent of Drawings, and that positions, levels, and clearances to adjacent work are maintained.
 - c. Before commencing work, verify that all clearances required by authorities having jurisdiction can be maintained.
 - d. If work is installed in wrong location, rectify it before construction continues.
 - e. Where dimensions are not available before fabrication commences, the dimensions required shall be verified with the consultant & agreed upon between the trades concerned.
 - f. All measurements shall be Metric as primary units, imperial measurements can be indicated as an alternative measurements only.

1.11 Contractor Use of Premises

1. Contractor has unrestricted use of site until Substantial Performance.
2. Coordinate limits of use of premises under direction of the Contract administrator, limits of construction as marked on the drawings
3. The Owner shall have the right to enter and occupy the existing building, in whole or in part, such entry and occupancy must not prevent or interfere with the Contractor in the performance of the Work. Such entry shall in no way be considered as an acceptance of the Work in whole, or in part, nor shall it imply acknowledgement that terms of the Agreement are fulfilled.
4. Maintain fire access/control

1.12 Protection of Work, Property and Persons

1. Include in work necessary methods, materials, and construction to ensure that no damage or harm to work, materials, property and persons results from the work of this Contract. Temporary facilities relating to protection are specified in Section 01 50 00.
2. Comply with all instructions and/or orders issued by authorities having jurisdiction.
3. Ensure that compulsory wearing of hard hats, safety vests and safety boots is observed by all persons employed on the work. Refuse admission to the premises to those refusing to wear same.
4. Protect adjacent private and public property from damage and, if damaged, make good immediately. Make good private property to match in all details its original condition in material and finishes as approved, and public property in accordance with requirements specified and/or instructed by its Owner or as directed by the Consultant.
5. Keep surfaces, on which finish materials will be applied, free from grease, oil, and other contamination which would be detrimental in any way to the application of finish materials.
6. Do not apply visible markings to surfaces exposed to view in finished state or that receive transparent finishes.
7. Protect surfaces of completed and existing work exposed to view from staining, disfigurement and all other damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Subcontractor the suitability of such protection in each case.
8. Enforce fire prevention methods at site for new work maintain existing in accordance with local authorities having jurisdiction. Do not permit bonfires, open flame heating devices or accumulation of debris. Use flammable materials only if proper safety precautions are taken, both in use and storage.
9. Do not store flammable materials in the building. Take necessary measures to prevent spontaneous combustion. Place cloths and other disposable materials that are a fire hazard in closed metal containers and remove them from the building every night.
10. Where flammable materials are being applied, ensure that adequate ventilation is provided, spark-proof equipment is used, and smoking and open flames are prohibited.
11. Ensure that volatile fluid wastes are not disposed of in storm or sanitary sewers or in open drain courses.
12. Public Utilities and Services:

- a. Verify location of and limitations imposed by, existing mechanical, electrical, telephone and similar services, and protect them from damage. If necessary, relocate active services to ensure that they function continuously wherever possible in safety and without risk of damage or down time to the existing buildings.
 - b. Cap off and remove unused utility and services encountered during work after approval is given by the utilities concerned or authorities having jurisdiction, which ever may apply. Relocation, removal, protection and capping of existing utility services shall be performed only by the applicable utility, and of other services by licensed mechanics.
 - c. Make arrangements and pay for connection charges for services required for the Work.
13. Ensure that precautions are taken to prevent leakage and spillage from plumbing and mechanical work that may damage surfaces and materials finished or unfinished.
 14. Give constant close supervision to roofing/waterproofing membranes following their installation, during the time they are temporarily protected or exposed, to ensure that no damage occurs to them before completion of building.
 15. Prevent spread of dust beyond the construction site by wetting, or by other approved means, as required or as directed by the Consultant and/or authorities having jurisdiction.

1.13 Inserts, Anchors, and Fastenings

1. Include in the work of each Section necessary fastenings, anchors, inserts, attachment accessories, and adhesives. Where installation of devices is in work of other Sections, deliver devices in ample time for installation, locate devices for other Sections and cooperate with other Sections as they require.
2. Do not install wood plugs or blocking for fastenings in masonry, concrete, or metal construction, unless specified or indicated on the drawings.
3. Do not use fastenings which cause spalling or cracking of materials in which they are installed. Do not use powder actuated fastening devices unless specified or prior written approval is given by the Consultant for each specific use.
4. Use only approved driven fasteners.
5. Install metal-to-metal fastenings fabricated of the same metal or of a metal which will not set up electrolytic action causing damage to fastenings or components, or both. Use noncorrosive or galvanized steel fastenings for exterior work, and where attached to, or contained within, exterior walls and slabs. Leave steel anchors bare where cast in concrete.
6. Install work with fastenings or adhesives in sufficient quantity to ensure permanent secure anchorage of materials, components, and equipment. Space anchors within limits of loadbearing or shear capacity.
7. Space exposed fastenings evenly and in an organized pattern. Keep number to a minimum. Provide exposed metal fastenings of same material, texture, colour and finish as metal on which they occur.

8. At fastenings that penetrate metal roof deck, ensure that penetrations are sealed airtight with approved sealant.
9. Galvanize steel anchors in masonry and at exterior of building, unless otherwise specified elsewhere. Leave steel anchors bare where cast in concrete.

1.14 Cleaning

1. Ensure that spatters, droppings, soil, labels, and debris are removed from surfaces to receive finishes, before they set up. Leave work and adjacent finished work in new condition.
2. Use only cleaning materials which are recommended for the intended purpose by both the manufacturer of the surface to be cleaned and by the cleaning material supplier.
3. Maintain areas "broom clean" at all times during the work. Vacuum clean interior areas immediately before finish painting commences.
4. Do not burn or bury waste material at site. Remove as often as required to avoid accumulation.
5. Do not allow waste material and debris to accumulate in an unsightly or hazardous manner. Sprinkle dusty accumulations with water or other approved materials during removal of same.
6. Control lowering of materials. Use as few handlings as possible. Do not drop or throw materials from storeys above grade.
7. Ensure that cleaning operations are scheduled to avoid deposit of dust or other foreign matter on surfaces during finishing work and until wet or tacky surfaces are cured.
8. Each Section shall supply the Contractor with instructions for final cleaning of his work, and for inclusion in Project Data Book as specified in each trade Section.
9. Final cleaning is to be performed one (1) week prior to opening the project to the public and shall include cleaning of all work as required by each trade. Co-ordinate final cleaning with Owner's maintenance staff.

1.15 Adjusting

1. Ensure that all parts of work fit snugly, accurately and in true planes, and that moving parts operate positively and freely, without binding and scraping.
2. Verify that work functions properly, and adjust it accordingly to ensure satisfactory operation.
3. Lubricate products as recommended by the supplier.

1.16 Salvage

1. Unless otherwise specified, surplus material resulting from construction, and construction debris shall become the property of Contractor, who shall dispose of it away from site.

1.17 Signage

1. All site signage prior to fabrication or installation shall have written approval by the Owner.
2. The Contractor shall submit to the owner a layout of all required signage, show types, sizes and locations.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01320 - Construction Progress Documentation
2. Section 01560 - Temporary Barriers and Enclosures
3. Section 01353 - Special Procedures Traffic Control

1.2 Existing Services

1. Notify the Town and utility companies of intended interruption of services and obtain required permission.
2. Where Work involves breaking into or connecting to existing services, give the Town or public authority 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
3. Construct safety barriers while providing access for pedestrian and vehicular traffic.

END OF SECTION

PART 1 GENERAL

1.1 Schedules Required

1. The Contractor to provide itemized pricing list as per Town of Oakville Bid Form.
2. The Contractor shall submit Construction Schedule including milestones for each major item of work or operation in accordance with the Pricing Form and as follows:
 1. Shop drawings and product data.
 2. Samples.
 3. The Town furnished products.
 4. Product delivery schedule.
 5. Shutdown and closure activity.
 6. Include dates for commencement and completion of each major element of construction.

1.2 Schedule Format

1. Prepare schedule in the form of a horizontal Gantt bar chart.
2. Provide a separate bar for each major item of work or operation.
3. Format and identification for listings to correspond with tasks in Pricing Summary.

1.3 Schedule Submission

1. Contractor to submit construction schedule in accordance with General Conditions of the contract documents. The contract administrator will review schedules and return a reviewed copy for revisions.
2. Resubmit finalized schedule within 5 working days after return of review copy, and within a minimum of 2 week prior to construction commencement.
3. Distribute copies of revised schedule to:
 1. The Town and/or contract administrator.
 2. Job site office.
 3. Subcontractors.
 4. Other concerned parties.
4. Instruct recipients to report to Contractor immediately, any problems anticipated by timetable shown in schedule and inform the contract administrator of such problems.

1.4 Progress Photographs

1. Ensure that photos are taken before and after each item of work or operation is complete as well as monthly with progress payment claim and prior to backfilling any underground work.

1.5 Meeting Minutes

1. The Contract administrator will be responsible for documenting, preparing and distributing the meeting minutes to all parties involved.
2. Meeting minutes will include but are not limited to project related discussions, decisions, schedules and occupational health & safety issues.
3. Any errors or discrepancies shall be brought to the attention of the writer in writing within 48 hours of the date of distribution, otherwise the contents will be assumed correct.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01320 - Construction Progress Documentation.
2. Section 01450 - Quality Control and Testing.
3. Section 01780 - Closeout Submittals.

1.2 Administrative

1. Submit to the Contract administrator submittals listed for review in the first meeting agenda. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
2. Work affected by submittal shall not proceed until review is complete.
3. Present shop drawings, product data, samples, and mock-ups in SI Metric units.
4. Where items or information is not produced in SI Metric units converted imperial values are acceptable to be shown as alternative units.
5. Review submittals prior to submission to the Contract administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
6. Notify the Contract administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
7. Verify that field measurements and affected adjacent Work are coordinated.
8. Contractor's responsibility for errors and omissions in submission is not relieved by the review of the submittals by the Contract administrator.
9. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Contract administrator review.
10. Keep one reviewed copy of each submission on site.

1.3 Shop Drawings and Product Data

1. The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of Work.
2. Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
3. Shop drawings for Specialty Designs should be sealed by a licensed engineer

4. Adjustments made on shop drawings by the Contract administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Contract administrator, and obtain a change order, prior to proceeding with Work.
5. Make changes in shop drawings as the Contract administrator may require, consistent with Contract Documents. When resubmitting, notify the Contract administrator in writing of any revisions other than those requested.
6. Submit shop drawings as requested on construction details and/or respective technical specification Sections. Accompany submissions with transmittal letter containing:
 1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. Identification and quantity of each shop drawing, product data and sample.
 5. Identify subcontractor, supplier, manufacturer, etc.
 6. Details as follows:
 1. Fabrication.
 2. Layout, showing dimensions including identified field dimensions, and clearances.
 3. Relationship to adjacent elements.
7. After review by the Contract administrator, distribute copies.
8. Submit 3 prints of shop drawings for each requirement requested in the specification Section or as the Contract administrator may reasonably request.
9. Submit 3 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by the Contract administrator where shop drawings will not be prepared due to standardized manufacture of product.
10. Delete information not applicable to the project.
11. Supplement standard information to provide details applicable to project.
12. If upon review by the Contract administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.4 Samples

1. Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.
2. Deliver samples prepaid to site or site office.
3. Notify the Contract administrator in writing, at time of submission of deviations in samples from requirements of Contract Documents.
4. Where colour, pattern or texture is criterion, submit full range of samples.
5. Adjustments made on samples by the Contract administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Contract administrator, and receive change order, prior to proceeding with Work.

6. Make changes in samples which the Contract administrator may require, consistent with Contract Documents.
7. Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 Mock-ups

1. Erect mock-ups in accordance with 01450 - Quality Control and Testing.

1.6 Progress Photographs

1. If requested, submit progress photographs in accordance with Section 01320 - Construction Progress Documentation.

1.7 Submittals at Substantial Performance

1. Inspect/Take Over:

- 1) Conform to OAA Closeout procedures.
- 2) Prior to application for certificate of Substantial Performance, carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete, defects are corrected, and building is clean and in condition for occupancy. Notify Consultant in writing, of satisfactory completion of the Work and request an inspection.
- 3) During Consultant inspection, a list of deficiencies and defects will be tabulated. Correct same. When Consultant considers deficiencies and defects have been corrected and it appears requirements of Contract have been performed, make application for certificate of Substantial Performance.
- 4) During Consultant inspection, a list of deficiencies and defects will be tabulated. Correct same. When Consultant considers deficiencies and defects have been corrected and it appears requirements of Contract have been performed, make application for certificate of Substantial Performance.
- 5) Publish a copy of the Substantial Performance once in a construction trade newspaper and provide the payment certifier with proof of the date publication. The day following the date of publication shall be the date of commencement of the 45-day period to release of the basic holdback monies.
- 6) Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining due. Consultant will issue a final change order reflecting approved adjustments to Contract Price not previously made.

2. Warranties and Bonds:

- 1) Submit all documents in proper form (including Project Warranty Data Record), contain full information.
- 2) Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers and manufacturers within 10 days after completion of the applicable item of work.
- 3) Submit prior to final Application for Payment.

- 4) Execute transition of Performance Bond to warranty period requirements.
- 5) Retain warranties and bonds until time specified for submittal.
- 6) Submit an updated list of company, subcontractor, supplier and manufacturer, with name, address and telephone number of responsible principal.

3. Operating Maintenance Data:

- (1) Two weeks prior to Substantial Performance of the Work, submit to Consultant, two copies of operating and maintenance data. Data to contain operational information on equipment, cleaning and lubrication schedules, filters, overhaul and adjustment schedules and similar maintenance information. Bind contents in a three-ring, hard covered, plastic jacketed binder. Organize contents into applicable categories of work, parallel to specifications Sections.

4. Project Record Manual:

- 1) Submit one hard copy and one soft copy (on memory stick) of Project Record Manual consisting of operation and maintenance data, current Material Safety Data Sheets and one set of record (as-built) hardcopy drawings and softcopy files on AutoCad version R18 or higher. Project Record Manual is also to include copy of "Project Warranty Data Record" both in hardcopy and softcopy form. Collect reviewed submittals and assemble documents executed by Subcontractors, suppliers, and manufacturers and submit material prior to final application for payment.
- 2) In addition, include the following
 1. Final Hydro
 2. Extended Warranties
 3. Extra Material

5. Final Hydro Inspection:

1. collect the following from each trade requiring hydro inspection/approval certificates, and submit same to Consultant:
 1. Original, final Hydro Inspection Certificates.
 2. Original approval certificates (CSA, ULC, etc.) for specified equipment.

6. Extended Warranties:

1. Provide the extended warranties specified. These extended warranties to commence immediately after the expiration of the standard one-year warranty included in the Contract under Article GC 12.3 Warranty, the General Conditions of the Contract. The contractor to submit them on the Form of Warranty, a sample of which is included in this section.

7. Extra Materials:

1. Provide the Owner with extra materials for future maintenance use, as specified in the technical Sections of the Specifications.

8. Plumbing Inspection Certificate

9. Record Drawings: As noted in item 4 Project Record Manual

10. Manufacturers' Data Book:

- (1) Supply two copies of a three-ring binder, to accommodate 213mm x 275mm (8 1/2" x 11") sheets. Binders should match in all dimensions. Include a title sheet labeled "Manufacturers' Data Book" with project name, date and list of contents. Organize required material into applicable sections of work. Mark each section by labeled tabs protected with celluloid covers fastened to hard paper dividers
- (2) Data Book to include:
 1. Equipment and operating instruction on all operable equipment and on all mechanical and electrical equipment, plumbing fixtures, and architectural hardware. Type notes. Drawings should be neatly drafted and inked or white printed.
 2. Maintenance instructions.
 3. Original brochures on all equipment.
 4. Parts lists on all equipment including a list of suppliers.
 5. All additional material used in the project beyond that indicated by brochures listed under the various sections, showing manufacturers and sources of supply.
 6. Names, addresses and telephone numbers of the designer(s) and major contractor(s) who worked on the building.
 7. Commissioning data such as air and water flows and regulating valve positions.

END OF SECTION

PART 1 GENERAL

1.1 Reference Standards

1. Canada Labour Code, Part II, Canada Occupational Health and Safety Regulations.
2. Province of Ontario:
 1. Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, c.0.1, as amended and O. Reg. 213/91 as amended - Updated 2005

1.2 Submittals

1. Submit in accordance with Section 01 33 00 - Submittal Procedures.
2. Submit site-specific Health and Safety Plan: Within 5 working days prior to the commencement of the Work. Health and Safety Plan must include:
 1. Results of site specific safety hazard assessment.
 2. Results of safety and health risk or hazard analysis for site tasks and operation.
3. Submit electronic copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
4. Submit electronic copies of incident and accident reports.
5. Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
6. Client Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 working days.
7. Client Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
8. Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Client Representative.
9. On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations

1.3 Filing of Notic

1. File Notice of Project with Provincial authorities prior to beginning of the Work

1.4 Safety Assessment

1. Perform site specific safety hazard assessment related to project

1.5 Meetings

1. Health and Safety requirements will be discussed at site pre-construction meeting with Department Representatives. Refer to Section 01 31 19 – Project Meetings

1.6 Regulatory Requirements

1. Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.7 Project / Site Condition

1. Work at site will involve contact with materials outlined in Designated Substances Survey (DSS) report. Copy of report will be provided by Department Representative. Review and implement remediation measures as required

1.8 General Requirements

1. Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
2. Client Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 Responsibility

1. Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
2. Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
3. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 Compliance Requirements

1. Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1 and Ontario Regulations for Construction Projects, O. Reg. 213/91

1.11 Unforeseen Hazards

1. When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Ontario and advise the Client Representative verbally and in writing

1.12 Health & Safety Management

1. Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

1. Have site-related working experience specific to activities associated with demolition, framing work installation, electrical & mechanical work, scaffolding, structural steel erection, Fire safety, and all other project requirements.
2. Have working knowledge of occupational safety and health regulations
3. Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
4. Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
5. Be on site during execution of Work and report directly to and be under direction of the site supervisor.

1.13 Posting Documents

1. Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Ontario, and in consultation with Client Representative.

1.14 Correction of Non-Compliance

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

1.15 Work Stoppage

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

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01 33 00 - Submittals
2. Section 01 74 20 – Waste Management Disposal

1.2 References

1. Canadian Environment Protection Act (CEPA)

1.3 Definitions

1. Definitions as written below are supplementary to all laws, statutes, and regulations effective in Ontario. Where definitions conflict, laws, statutes, and regulations take precedent over the definitions below.
2. Environmental Pollution and Damage: Presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
3. Environmental Protection: Prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.4 Submittals

1. Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
2. Submit Environmental Protection Plan for review and approval by the Client.
 1. Plan is to be a comprehensive overview of known or potential environmental issues to be addressed during construction.
 2. Submit prior to commencing construction activities or delivery of materials to site,
 3. Topics level of detail shall be equal with environmental issue and required construction task[s].
3. Environmental Protection Plan: Plan to include the following:
 1. Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
 2. Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from site.
 3. Name[s] and qualifications of person[s] responsible for training site personnel.
 4. Descriptions of environmental protection personnel training program.
 5. Drawings: Drawings to show locations of proposed temporary material storage areas, structures, sanitary facilities, and bins for collecting excess materials including methods to control runoff (if any) and to contain materials on site.

6. Work Area Plan shows proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
7. Non-Hazardous Solid Waste disposal Plan: Plan identifies methods and locations for solid waste disposal including clearing debris.
8. Air Pollution Control Plan: Plan details provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
9. Waste Water Management Plan: Plan identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as clean-up water, disinfection water, hydrostatic test water, and water used in flushing of lines.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.1 Environmental Control

1. Obtain Federal, Provincial and Local Municipality regulations pertaining to waste, air, solid waste, chemical waste, sanitary waste, sediment and noise pollution.
2. Provide monitoring and reporting to assure that control measures are in compliance with Plan and authority (Federal, Provincial, and Municipal) laws and regulations.
3. Water Resources Protection:
 1. Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water in such quantities as to affect normal use, aesthetics, or produce a measurable ecological impact on the area.
 2. Store and service construction equipment at areas designated for collection of oil wastes.
4. Drainage:
 1. Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
 2. Do not pump water containing suspended materials into waterways, sewer or drainage systems.
 3. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
5. Work Adjacent to Waterways:
 1. Do not operate construction equipment in waterways.
 2. Do not use waterway beds for borrow material.
 3. Do not dump excavated fill, waste material or debris in waterways.
 4. Do not skid logs or construction materials across waterways.

6. Land resources:
 1. Prior to construction, identify all land resources to be preserved within the work area, with the Province.
 2. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without written permission from the Province.

3.2 Pollution Control

1. Maintain temporary erosion and pollution control features installed under this contract.
2. Control emissions from equipment and plant to local authorities' emission requirements.
3. Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.
4. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads

3.3 Delivery, Storage and Handling

1. Take special care to prevent accumulation of moisture on materials and within packaging during delivery, storage and handling to prevent development of mould and mildew on packaging and on products.
2. Request that suppliers give special attention to minimizing the packaging of materials and equipment:
 1. Deliver materials in recyclable, or in reusable packaging, such as cardboard, wood paper, or reusable blankets which will be reclaimed by supplier or manufacturer for recycling.
 2. Minimize packaging materials to maximum extent possible while still ensuring protection of materials during delivery, storage and handling.
 3. Minimize the use of the following packaging materials: Polyurethane, polyisocyanurate, polyethylene, and similar plastic materials such as “foam” plastics and “shrink-fit” plastics.
 4. Reusable blankets: Deliver and store materials in reusable blankets and mats reclaimed by manufacturers or suppliers for reuse where program exists or where program can be developed for such reuse.
 5. Pallets: Ensure pallets are removed from site for reuse or for recycling.
 6. Corrugated cardboard and paper: Refer to Section 01 74 20 for recycling.

END OF SECTION

PART 1 GENERAL

1.1 References

1. Uniform Traffic Control Devices for Canada, (UTCD), latest edition of MTO Book 7.

1.2 Protection of Public Traffic

1. Comply with requirements of Acts, Regulations and By-laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
2. When working on travelled way:
 1. Place equipment in position to present minimum of interference and hazard to travelling public.
 2. Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 3. Do not leave equipment on travelled way overnight.
3. Do not close any lanes of road without approval of the Town. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in MTO Book 7.
4. Keep travelled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.
 - a. Provide minimum 7 m wide temporary roadway for traffic in two-way sections through Work and on detours.
 - b. Provide minimum 5 m wide temporary roadway for traffic in one-way sections through Work and on detours.
5. As directed by the Contract administrator, provide graveled detours or temporary roads to facilitate passage of traffic around restricted construction area:
6. Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of the Contract administrator.

1.3 Informational and Warning Devices

1. Provide and maintain signs, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
2. Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of UTCD manual.
3. Place signs and other devices in locations recommended in UTCD manual.
4. Meet with the Contract administrator prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of the Contract administrator.
5. Continually maintain traffic control devices in use by:

1. Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
2. Removing or covering signs which do not apply to conditions existing from day to day.

1.4 Control of Public Traffic

1. Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD manual & MTO Book7 in following situations:
 1. When public traffic is required to pass working vehicles or equipment which block all or part of travelled roadway.
 2. When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 3. When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 4. Where temporary protection is required while other traffic control devices are being erected or taken down.
 5. For emergency protection when other traffic control devices are not readily available.
 6. In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

1.5 Operational Requirements

1. Maintain existing conditions for traffic throughout period of contract.

END OF SECTION

PART 1 GENERAL

1.1 References and Codes

1. Perform Work in accordance with National Building Code of Canada (NBC) and Ontario Building Code (OBC) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
2. Meet or exceed requirements of:
 1. Contract documents.
 2. Specified standards, codes and referenced documents.

1.2 Hazardous Material Discovery

1. Should any hazardous material be encountered in course of demolition work, immediately stop work and notify the Contract administrator.

1.3 Building Smoking Environment

1. Comply with smoking restrictions. Smoking is not permitted on any lands owned by the Town By-laws.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01330 - Submittal Procedures.
2. Section 01780 - Closeout Submittals.

1.2 Inspection

1. Inspections are paid by the contractor per allowance
2. Allow the Inspector to access Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
3. Provide timely request for inspection of Work that is designated for testing, inspecting or verification as specified or required by current regulations.
4. If Contractor covers or permits to cover Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests be satisfactorily completed and make good such Work.
5. The Contract administrator may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.3 Independent Inspection Agencies

1. Independent inspection/testing Agency will be appointed by the Contract administrator and engaged by the Contractor for purpose of inspecting and/or testing portions of Work.
2. Contractor to contact Contract administrator appointed testing agency directly for all testing requirements.
3. Provide equipment required for executing inspection and testing by appointed agencies.
4. Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
5. If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised at no cost to the Contract administrator.
6. Contractor to pay costs for testing and inspection. Contractor to pay costs for all retesting and re-inspection associated with failed tests.
7. Should a location require additional testing, outside of retesting for re-inspection, this shall be approved by the Contract administrator and born at the cost of the project. Unless additional testing is required due to inferior work previously completed or improper compaction during installation. In this case, the cost of additional testing shall be born at the cost of the Contractor.

1.4 Access to Work

1. Allow inspection/testing agency access to Work, off site manufacturing and fabrication plants.
2. Co-operate with inspection/testing agency to provide reasonable facilities for such access.

1.5 Procedures

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

1.7 Reports

1. Submit copies of inspection and test reports for the Consultant, the Owners, the Contractor and other applicable Consultants and jurisdictional authorities.
2. Provide copies to Sub-contractors of Work being inspected or tested, manufacturer or fabricator of material being inspected or tested.
3. Report unsatisfactory results immediately.

1.8 Rejected Work

1. If initial inspections and test indicate non-compliance with Contract Documents, original inspector to perform subsequent testing and or inspection. Contractor to bear costs.
2. Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Contract administrator as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents. Promptly remove and replace or repair rejected defective materials and workmanship to the Consultant's satisfaction at No expense to the Owner.
3. Make good other Contractor's work damaged by such removals or replacements promptly.

1.9 Reports

1. Reports by Contract administrator appointed Testing agency will be distributed by the Testing agency.
2. Reports of all other inspection and test results will be distributed by the Contractor. 2 copies for each party.

1.10 Tests and Mix Designs

1. Furnish test results and mix designs as required.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01560 - Temporary Barriers and Enclosures.

1.2 Installation and Removal

1. Provide construction facilities in order to execute work expeditiously.
2. Remove from site all such work after use.

1.3 Hoisting

1. Provide, operate and maintain hoists or cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
2. Hoists and cranes shall be operated by qualified operators.

1.4 Site Storage/Loading

1. Do not unreasonably encumber premises with products.
2. Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.5 Construction Parking/Equipment Storage

1. Parking is not permitted on construction site to avoid disrupt performance of Work – make good any damage. Contractor shall enter the site where shown on site plan or otherwise approved by the Contract administrator & Owner.
2. Provide and maintain adequate access to project site.
3. Authorization to use roadway must be granted by the Contract administrator through obtaining a permit of a Road Occupancy. Contractor shall maintain such roads for duration of Contract and clean and make good damage resulting from Contractors' use of roads.

1.6 Security

1. Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.7 Equipment, Tool and Materials Storage

1. Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
2. Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.8 Sanitary Facilities

1. Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
2. Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.9 Construction Signage

1. Ensure construction signs are posted prior to the commencement of construction. Project signs will be provided and installed by the Contract administrator. The contractor shall be responsible for any/all other signage as required by law.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01353 - Special Procedures Traffic Control
2. Section 01520 - Construction Facilities

1.2 Installation and Removal

1. Provide temporary controls in order to execute Work expeditiously.
2. Remove from site all such work after use.

1.3 Hoarding

1. Erect temporary site enclosure using 1.8m high temporary modular fencing. Maintain fence in good repair and ensure that the construction site is secure at the beginning and end of each working day.
2. If applicable; Provide barriers around trees and plants designated to remain as required. Protect from damage by equipment and construction procedures as per applicable detail.
3. Should the project schedule be prolonged by an unforeseen delay (ie. material supplier delivery and installation schedule), the Contractor shall be responsible to maintain fencing until substantial completion. No addition compensation will be available should this occur.

1.5 Guard Rails and Barricades

1. Provide and install, secure, rigid guardrail and barricades around all deep excavations.

1.6 Access to Site

1. Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.7 Public Traffic Flow

1. Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.8 Fire Routes

1. Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 Protection for Off-Site and Public Property

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

1.10 Protection of Adjacent Buildings

1. Provide protection for finished and partially finished adjacent buildings and equipment during performance of Work.
2. Provide necessary screens, covers, and hoardings.
3. Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01450 - Quality Control and Testing

1.2 Reference Standards

1. Conform to standards, in whole or in part as specifically requested in specifications.
2. If there is question as to whether any product or system is in conformance with applicable standards, the Contract administrator reserves right to have such products or systems tested to prove or disprove conformance.
3. The cost for such testing will be borne by the Contractor in event of conformance with Contract Documents or by Contractor in event of non-conformance.
4. Conform to latest date of issue of referenced standards in effect on date Contract signing, except where specific date or issue is specifically noted.

1.3 Quality

1. Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
2. Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
3. Should any dispute arise as to quality or fitness of products, decision rests strictly with the Contract administrator based upon requirements of the Contract Documents.
4. Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item in the Work.
5. Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 Availability

1. Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify the Contract administrator of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
2. In event of failure to notify the Contract administrator at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Contract administrator reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

1. Handle and store products in manner to prevent damage, contamination, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
2. Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
3. Store products subject to damage from weather in weatherproof enclosures.
4. Store cementitious products clear of earth or concrete floors, and away from walls.
5. Store lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
6. Ensure all stockpiled materials remain clean and free from organic matter. Locate piles separate so to avoid contamination.
7. Safely store combustible fuels and oil for machinery. Take every precaution necessary to prevent spontaneous combustion.
8. Remove and replace damaged products at Contractor's own expense and to satisfaction of the Contract administrator.
9. Touch-up damaged factory finished surfaces to the satisfaction of the Contract administrator. Use touch-up materials to match original. Do not paint over name plates.

1.6 Transportation

1. Pay costs of transportation of products required in performance of Work.
2. Pay for transportation costs of products supplied by the Contract administrator. Pick-up, load, unload, handle and store such products unless otherwise discussed and approved by the Contract administrator.

1.7 Manufacturer's Instructions

1. Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Obtain written instructions directly from manufacturers.
2. Notify the Contract administrator in writing, of conflicts between specifications and manufacturer's instructions, so that the Contract administrator may establish course of action.
3. Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Contract administrator to require removal and reinstallation at no increase in Contract Price or Contract Time.

1.8 Quality of Work

1. Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify the Contract administrator if required Work is such as to make it impractical to produce required results.
2. Do not employ anyone unskilled in their required duties. The Contract administrator reserves right to require dismissal from site, workers deemed incompetent or careless.

3. Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with the Contract administrator, whose decision is final.

1.9 Coordination

1. Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
2. Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 Remedial Work

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

1.11 Location of Fixtures

1. Consider location of drains, fixtures, outlets, and mechanical and electrical items indicated as approximate.
2. Inform the Contract administrator of conflicting installation. Install as directed.

1.12 Fastenings

1. Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
2. Prevent electrolytic action between dissimilar metals and materials.
3. Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
4. Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
5. Keep exposed fastenings to a minimum, space evenly and install neatly.
6. Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 Fastenings - Equipment

1. Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
2. Use heavy hexagon heads, semi-finished unless otherwise specified. Use stainless steel for exterior areas.

3. Bolts may not project more than one diameter beyond nuts.
4. Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 Protection of Work in Progress

1. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of the Contract administrator.

1.15 Existing Utilities

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

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01320 - Construction Progress Documentation.

1.2 Field Offices & Sheds

1. Construction Offices/Trailers
 - a) Provide and maintain in clean condition during progress of the Work. Adequately lighted heated and ventilated Contractor's office with space for filing and layout of contract documents.
 - b) Keep one bound set of drawings and specifications, change orders, color schedule, construction schedule, shop drawings, meeting diaries, and hardware lists in the office at all times.
 - c) Sub-contractors may provide their own offices as necessary.
 - d) Provide adequate first aid facilities.
2. Storage Sheds:
 - a) Provide secure, weather tight sheds for storing materials requiring protection.
 - b) Raise floors a minimum of 300mm above grade.
 - c) Include lighting in all sheds and heat in those sheds containing materials requiring heated storage.

1.3 Utilities

1. Existing Services
 - a) Take appropriate precautions when working near existing above and below ground services.
 - b) Notify the various utilities and arrange for proper stakeouts.
 - c) Making good damage of any nature to utilities shall be the responsibility of the Contractor.
2. Temporary Heating
 - a) Provide temporary heating if work extends into the heating season including attendance, maintenance and fuel.
 - b) Vent to exterior all construction heaters used inside building or use non- flameless type. Solid fuel salamanders not permitted.
 - c) Maintain temperatures of minimum 12°C (55°F) degrees in areas where construction is in progress, unless indicated otherwise in specifications.
 - d) Ventilate heated areas, keep building free of exhaust or combustion gases.
3. Ventilation
 - a) Provide adequate ventilation to meet health regulations for safe working environment.

- b) Prevent accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction.
 - c) Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - d) Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
4. Water
- a) Make a connection to the Owner's existing water supply and run all temporary lines required. Owner will pay.
 - 1. Maintain all connections in serviceable condition.
Power & Light
 - a) Connect to Owner's existing electrical panel for temporary power; the Owner will pay for power consumed.
 - b) Temporary power distribution to comply with Ontario Electrical Safety Code.
5. Sanitary Facilities
- a) Provide sufficient sanitary facilities for workers in accordance with local Health Regulations.

1.4 Building Enclosure

1. Weather Enclosure
- a) Provide weather tight closures to unfinished door and window openings.
 - b) Supply temporary doors at all appropriate openings complete with hinges, locks and hasps to protect the Work from theft and weather.
 - c) Close off floor areas where walls are not finished; seal off other openings; enclose building interior Work area for temporary heat.
2. Protection of Building Finishes & Equipment
- a) Provide protection for finished and partially finished building finishes and equipment during performance of Work.
 - b) Be responsible for damage incurred due to lack of or improper protection.

1.5 Barriers & Protection

1. Establish Construction Near Trees
- a) Take adequate precautions to protect all trees on the work site from damage.
 - b) Do not store materials or place equipment over root system.
 - c) Install protective fencing under the limits of the tree crowns or if this is not practical protect trunks with purpose made tree guards.
 - d) Where limbs or portion of trees are removed to accommodate construction.

1.6 Dust, Nuisance, Mud, Snow and Ice Removal

1. Prevent nuisance to adjacent properties near the works from dust raising and mud deposits, by taking appropriate anti-dust and mud measures, at such times as found necessary, and as directed by the Consultant, or at any other times complaints of dust or mud are received from the public by either the Contractor, the Consultant, or the Municipality.
2. Remove mud deposits from all pavement.

1.7 Construction Aids

1. Drainage, Ditches & Storm / Sanitary Sewers
 - a) Maintain the flow, at all times, during construction of any and all ditches, drainage channels and/or storm/sanitary sewer systems.
 - b) Make allowance for any conditions, which may be encountered as a result of ditch or storm/sanitary flows diver or pump as may be required.

1.8 Project Sign

1. Provide and erect, within two (2) weeks of signing contract, a project sign in a location designated by the Consultant.
2. Construct sign 4'-0" x 8'-0" (2400 x 4800mm), of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.
3. Indicate on sign, the names of Owner, [Consultant], [and] Contractor [and Sub-contractor], of a design style [established by the Consultant] [as detailed herein].
4. Maintain sign in clean condition.
5. No other signs or advertisements, other than warning signs are permitted on site.
6. Obtain and pay for Permit for project sign.

1.9 Safeguards

Temporary Closures:

1. Provide all necessary temporary closures, hoardings, fences, gates, guardrails, hoists, stairs, ladders, scaffolding, staffing, runways, night lights, and barriers as necessary for the work.
2. Conform to all such requirements of the Labour Laws and other Provincial or local labour safety laws, applicable thereto.
3. Be responsible for all scaffolding, formwork, or other temporary supports used during the work. Support all scaffolding independently of the building's finished surfaces. Include covered walkways at protected exits.
4. Use temporary fire standpipes and hose, or other approved fire extinguishing equipment in the building(s) until the permanent fire protection system in the building(s) is available.
5. Should work be stopped for any cause, provide protection for the work and all necessary temporary cold weather heating during all such periods of work stoppages.

6. Keep all portions of the work properly and efficiently drained during construction and until completion.

1.10 Construction Parking

1. Parking will be permitted on site , number of parking spots to be approved by the Owner.

1.11 Removal of Temporary Facilities

1. When no longer required remove completely from site.
2. Make good any damaged or disturbed areas or surfaces or sod, paving or walks.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01320 - Construction Progress Documentation.

1.2 References

1. Contract administrator's identification of existing survey control points and property limits.

1.3 Qualifications of Surveyor

1. Qualified registered land surveyor, licensed to practice in Ontario, acceptable to the Contract administrator. GPS layout capabilities are required.

1.4 Survey Reference Points

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

1.5 Survey Requirements

1. Establish one permanent bench mark on site, referenced to established bench marks by survey control points. Record location, with horizontal and vertical data in Project Record Documents.
2. Establish lines and levels, locate and lay out, by instrumentation.
3. Establish pipe invert elevations if needed for the plumbing work.
4. Establish floor elevations.
5. Establish lines and levels for mechanical and electrical work.

1.6 Existing Services

1. Before commencing work, establish location and extent of service lines in area of Work and notify the Contract administrator of findings.
2. Remove abandoned service lines within 2 m of new structures. Cap or otherwise seal lines at cut-off points as directed by the Contract administrator.

1.7 Location of Equipment and Fixtures

1. Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
2. Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
3. Inform the Contract administrator of impending installation and obtain approval for actual location.
4. Submit field drawings to indicate relative position of various services and equipment when required by the Contract administrator.

1.8 Records

1. Maintain a complete, accurate log of control and survey work as it progresses.
2. Record locations of maintained, re-routed and abandoned service lines.
3. Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

1.9 Subsurface Conditions

1. Promptly notify the Contract administrator in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
2. After prompt investigation, should the Contract administrator determine that conditions do differ materially, instructions will be issued for changes in Work.

1.10 Site Acceptance

1. The Contractor **MUST** make careful examination of existing site conditions and advise the Contract administrator of unsatisfactory site conditions **PRIOR** to commencement of construction. Commencement of construction will mean that the Contractor has accepted the site and no allowance will be made later for any expenses incurred due to failure to note unsatisfactory site conditions.
2. Contractor shall notify Contract administrator of any unsatisfactory site conditions are encountered. Contractor shall be responsible to notify the Contract administrator with a minimum of 48 hours prior to commencement of construction or delivery of materials.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01320 – Construction Progress Documentation
2. Section 01330 – Submittal Procedure
3. Section 01450 – Quality Control & Testing

1.2 Submissions

1. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
2. Submit one (1) copy of completed volumes in final form 15 days prior to [final inspection] [Substantial Performance].
3. Copy will be returned [after final inspection] with Consultant comments.
4. Revise content of documents as required prior to final submittal.
5. Two (2) weeks prior to Substantial Performance of the work submit to the [Consultant], two (2) final copies of operating and maintenance manuals.

1.3 Format

1. Organize data in the form of an instructional manual.
2. Binders: commercial quality, (8 1/2 x 11") [219 x 279 mm] maximum ring size.
3. When multiple binders are used, correlate data into related consistent groupings.
4. Cover: Identify each binder with type or printed title "Project Record Documents"; list title of Project, identify subject matter of contents.
5. Arrange content by [systems] [process flow], under section numbers and sequence of Table of Contents.
6. Provide tabbed fly leaf for each separate product and system, with typed description of product and major components of equipment.
7. Test: Manufacturer's printed data, or typewritten data on 20-pound paper.
8. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 Contents of Each Volume

1. Table of Contents: provide title of project, names, addresses, and telephone numbers of each Consultant and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

2. For each Product or System: list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
3. Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
4. Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
5. Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions

1.5 Record Documents and Samples

1. In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
 - 1.1. Contract Drawings.
 - 1.2. Specifications.
 - 1.3. Addenda.
 - 1.4. Change Orders and other modifications to the Contract.
 - 1.5. Reviewed shop drawings, product data, and samples.
 - 1.6. Field test records.
 - 1.7. Inspection certificates.
 - 1.8. Manufacturer's certificates.
2. Store Record Documents and samples in Field Office apart from documents used for construction. Provide files, racks, and secure storage.
3. Label and file in accordance with SECTION number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
4. Maintain Record Documents in a clean, dry and legible condition. Do not use Record Documents for construction purposes.
5. Keep Record Documents and samples available for inspection by Consultant.

1.6 Recording Actual Site Conditions

1. Record relevant information on a set of opaque drawings. Include an annotated copy in the Owner's Manual
2. Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
3. Record information concurrently with construction progress. Do not conceal work until required information is recorded.
4. Contract Drawings and Shop Drawings: legibly mark each item to record actual construction, including:

- a) Measure depths of elements of foundation in relation to finish first floor datum.
- b) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- c) Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- d) Field changes of dimension and detail.
- e) Changes made by change order.
- f) Details not on original Contract Drawings.
- g) References to related shop drawings and modifications.

5. Specifications: legibly mark each item to record actual construction, including:

- a) Manufacturer, trade name, and catalog number of each project actually installed, particularly optional items and substitute items.
- b) Changes made by Addenda and Change Orders.

6. Other Documents: maintain [Manufacturer's certifications,] [inspection certifications,] [field test records,] required by individual specification sections.

1.7 Equipment and Systems

1. Each Item on Equipment and Each System: include description of unit or system, and components parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and completed nomenclature and commercial number of replaceable parts.
2. Panel Board Circuit Directories: provide electrical service characteristics, controls, and communications.
3. Include installed colour coded wiring diagrams.
4. Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter and any special operating instructions.
5. Maintenance Requirements: include routine procedures and guide for trouble- shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
6. Provide servicing and lubrication schedule, and list of lubricants required.
7. Include manufacturer's printed operation and maintenance instructions.
8. Include sequence of operation by controls manufacturer
9. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
10. Provide installed control diagrams by controls manufacturer.
11. Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

12. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
13. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
14. Include test and balancing reports as specified in Section 01400.
15. Additional Requirements: As specified in individual specification sections.

1.8 Materials and Finishes

1. Building Product, Applied Materials and Finishes: include product data. With catalog number, size, composition, and colour and texture designations. [Provide information for re-ordering custom manufactured products].
2. Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
3. Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommend schedule for cleaning and maintenance.
4. Additional Requirements: as specified in individual specification sections.

1.9 Warranties and Bonds

1. Separate each warranty or bond with index tab sheets keyed to the List of Contents listing.
2. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
3. Obtain warranties and bonds, executed in duplicate by subcontractor, suppliers, and manufacturers, within [ten] days after completion of the applicable item of work.
4. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
5. Verify that documents are in proper form, contain full information, and are notarized.
6. Co-execute submittals when required.
7. Retain warranties and bonds until time specified for submittal.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01110 - Summary of Work.
2. Section 01330 - Submittal Procedures.

1.2 Preparation

1. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
2. After uncovering, inspect conditions affecting performance of Work.
3. Beginning of cutting or patching means acceptance of existing conditions.
4. Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
5. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.3 Execution

1. Execute cutting, fitting, and patching including excavation and fill, to complete Work.
2. Fit several parts together, to integrate with other Work.
3. Uncover Work to install ill-timed Work.
4. Remove and replace defective and nonconforming Work.
5. Remove samples of installed Work for testing.
6. Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
7. Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
8. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
9. Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools are not allowed on masonry work without prior approval by the Contract administrator.
10. Restore work with new products in accordance with requirements of Contract Documents.
11. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
12. At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the Construction element
13. Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
14. Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01780 - Closeout Submittals

1.2 Project Cleanliness

1. Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by the Trades, sub-trades or other Contractors.
2. Remove waste materials from site and roads daily, unless approved otherwise. Do not burn waste materials on site.
3. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
4. Provide and use clearly marked separate bins for recycling if applicable.
5. Remove waste material and debris from site at end of each working day.
6. Store volatile waste in covered metal containers, and remove from premises at end of each working day.
7. Provide adequate ventilation during use of volatile or noxious substances.
8. Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
9. Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces.
10. Remove dirt and other disfiguration from exterior surfaces.
11. Broom clean and wash exterior walks, steps and surfaces.

1.3 Cleaning Prior to Acceptance

1. Prior to applying for Substantial Performance of the Work, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work
2. Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy
3. Prior to final review, remove surplus products, tools, construction machinery and equipment.
4. Remove waste products and debris other than that caused by Owner or other Contractors.
5. Clean and polish glass, mirrors, hardware, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
6. Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
7. Clean lighting reflectors, lenses, and other lighting surfaces.

8. Vacuum clean and dust building interiors, behind grilles, louvres and screens.
9. Clean and polish surface finishes, as recommended by manufacturer.
10. Inspect finishes, fitments and equipment and ensure specified workmanship and operation
11. Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
12. Remove dirt and other disfiguration from exterior surfaces.
13. Clean and sweep roofs.
14. Sweep and wash clean paved areas.
15. Clean equipment and fixtures to a sanitary condition; clean filters of mechanical equipment.
16. Clean roof surfaces, down-spouts, and drainage components.
17. Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

1.4 Final Cleaning

1. When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining work.
2. Remove waste products and debris and leave Work clean and suitable for occupancy.
3. Prior to final review, remove surplus products, tools, construction machinery and equipment.
4. Remove stains, spots, marks and dirt from all surfaces.
5. Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
6. Remove dirt and other disfiguration from exterior surfaces.
7. Sweep and wash clean paved areas.

END OF SECTION

PART 1 GENERAL

1.1 Waste Management Goal

1. Organize waste management so that the various actions are assigned priorities that match the 3R hierarchy, namely, in descending order of importance, reduction, reuse and recycling.
2. Items in good condition shall be reused in this project or in other Canada projects, as determined by the Client Representative or, where appropriate, shall be sent to an appropriate recycling facility, with proof of this having been done provided by the contractor.
3. Provide Client Representative with documentation certifying that comprehensive measures and procedures for waste management, recycling, reuse of recyclable and reusable materials, and disposal have been implemented.
4. Perform waste management in accordance with the criteria governing environmental conservation and sustainable development.
5. Conform to the applicable national, provincial and local standards.

1.2 Definitions

1. Waste: Obsolete substance, material or object which cannot be recovered for purposes of reuse, recycling or some other form of recovery, and is therefore destined for disposal.
2. Residual material: Substance, material or object which is obsolete or has been rejected for some other reason, and which can be put to use or disposed of.
3. Residual materials from the site of construction, renovation or demolition (CRD) work: Any residual materials which result from construction, renovation or demolition work (wood, brick, concrete, etc.).
4. Hazardous residual materials: Any hazardous materials which are no longer used for their original intended purpose and which must be recovered for purposes of recycling, processing or disposal.
5. Source reduction: Minimizing of the consumption of raw materials by selecting products with recycled content and products which have been recovered for reuse, with or without reconditioning.
6. Recovery: Collection of secondary materials for purposes of reuse, recycling or some other form of recovery.
7. Reuse: Repeated use of a product, without modifying its properties, on the site or for another project.
8. Recycle: The use of a secondary material within the same manufacturing process from which it originated, as a substitute for virgin material of the same type, or the introduction of material recovered from a production cycle other than the one from which it originated.
9. Recovery: Recuperation of energy stored in the chemical bonds by transforming recovered materials.
10. Elimination: Disposal of a resource without allowing it to be used as a secondary material.

11. Source waste sorting: On-site sorting of residual materials produced on site into specially-identified containers. The containers are then redirected to the corresponding treatment facility.
12. Treatment facility: A treatment facility is the location where material is treated, whether definitively or otherwise (recycling, recovery, landfilling, etc.).
13. 4R: Reduction at the source, reuse, recycling and recovery

1.3 Submittals

1. Submit required documents to Client Representative in accordance with Section 01 33 00 – Submittal Procedures.
2. Prepare and submit ten (10) days prior to commencement of work a Waste Management Plan including, but not limited to, the following:
 1. The destination of the waste materials indicated.
 2. The name, address and other coordinates of the centres to be used for recovery, recycling and disposal.
 3. The techniques and sequence for the deconstruction/disassembly work.
 4. The schedule for the deconstruction/disassembly work.
 5. Location of containers.
 6. Security measures.
 7. Protection measures.
 8. Precise indication of the storage areas.
 9. Details regarding the handling and removal of waste materials.
 10. The quantities of waste materials that will be either recovered for reuse or landfilled.
3. Submit for approval by Client Representative specific agreements with suppliers and subcontractors for recovery at start-up meeting and prior to the awarding of any performance or materials supply contract.
4. Supply waybills confirming dispatching of materials for recycling or disposal at applicable facilities, showing types of material, quantities leaving the site, date and time, and signed by the hauler and the recipient.
5. Submit to the Client Representative a monthly log indicating the following:
 1. The name of the hauler.
 2. The load number.
 3. The pick-up date and time.
 4. The type of material.
 5. The weight or volume of each material.
 6. The number of the associated weight vouchers or invoices.

7. The number of the associated container.
8. An electronic copy of the receipts and weigh tickets specifying the recycled quantities and the landfilled quantities.
9. Comments and photos as needed.
10. A complete list of the treatment facilities and their coordinates.
6. Prior to the commencement of the work, the contractor may submit for the approval of the Client Representative a sample of the monthly monitoring log.
7. Submit a final report which includes the required supporting documents and a summary of each material which was landfilled or which was diverted from landfill.
8. Obtain letters from the project recovery facilities to certify the use to which each of the materials was put. These certifying letters shall include the following:
 1. The complete coordinates of the recovery facility.
 2. The name of the general contractor and the project.
 3. The list of the residual materials recovered by this facility.
 4. A description of the method of recovery used for the recuperated materials and the purpose.
 5. The signature of the representative of the recovery facility.
 6. The signature and date of approval of the Client Representative, provided prior to the commencement of the performance or the purchase which is the object of the agreement

1.4 Implementation

1. Take the required steps to avoid contaminating the containers which will be used for the management of the waste materials.
2. Provide the on-site installations required for the collection, transportation and storage of the waste materials without interfering with the other site activities. Provide a suitable number of containers, receptacles and chutes to correspond to the frequency of collection. The sorting of the waste materials may be performed onsite or at an off-site sorting centre, depending on which method is best-suited to the project.
3. Place the storage areas for the materials strategically on-site to prevent damage or deterioration from occurring to them.
4. Develop clear signage to identify each container and to facilitate the sorting and placement of the materials.
5. Ensure that the installations are accessible to the workers at all times. The containers should be placed so as to facilitate the sorting and placement of the materials.
6. The main materials to be sorted are as follows:
 1. Concrete waste.
 2. Metal waste and cut-offs.
 3. Masonry waste and cut-offs.

4. Gypsum waste and cut-offs.
5. Wood waste and cut-offs.
6. Glass waste and cut-offs.
7. Paper and cardboard waste and cut-offs.
8. Insulation waste and cut-offs.
7. Handle hazardous materials (if any) separately. Don't count them in the calculation of the waste reduction percentages.
8. Dispose of hazardous residual materials (if any) in accordance with the requirements of the laws and regulations in effect.
9. The burning of untreated wood is permitted as long as the incineration is performed by a power plant capable of generating heat and/or electricity.
10. For any other condition, combustion may not be used as a means as an alternative method for diverting waste from landfill sites.
11. Clean excavated soil and rock (if any) may be reused on-site to the degree permitted by the operations. Clean excavated materials which are not used on-site shall be disposed of, for purposes of reuse, to third parties and shall not, in any circumstance, be disposed of by landfilling.
12. Contaminated excavated material (if any) shall be disposed of in accordance with current laws and regulations

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.1 General

1. Perform all work in accordance with Waste Management Plan.
2. Waste that is not reused, recycled or recovered shall be handled in accordance with applicable codes and regulations.
3. It is prohibited to bury rubbish and waste materials.
4. It is prohibited to discard waste of any kind in a watercourse or in a storm or sanitary sewer.
5. Collect waste materials as the deconstruction/disassembly work proceeds.
6. Empty the waste containers regularly.
7. The contractor is responsible for implementing, communicating, coordinating and overseeing the Waste Management Plan.
8. The suppliers and contractors are responsible for the waste materials and rubbish generated by their activities on the worksite.

9. The contractor is responsible for on-site signage, accessibility to the bins, chutes and containers, and for transmitting information to the workers concerning the implementation of the Waste Management Plan.
10. Establish procedures to prevent any contamination of the containers for the materials which are to be recovered because the waste treatment facilities may refuse contaminated containers or impose additional fees. The fees charged for sorting or for decontaminating the containers shall be borne by the offending subcontractor

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01780 - Closeout Submittals

1.2 Inspection and Declaration

1. The Contract administrator and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
2. A declaration of Substantial Performance is issued by the Consultant when the Consultant considers deficiencies and defects to have been corrected and the requirements of Contract have been substantially performed.
3. The date of issuance of the declaration of Substantial Performance by the Consultant shall be date for commencement of the warranty period.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01320 - Construction Progress Documentation
2. Section 01780 – Closeout Submittals

1.2 Extended Warranties

1. Warranties shall be in accordance with the General Conditions and as follows:
 1. Written warranty shall be furnished by individual manufacturer for particular product/system/assembly or by Subcontractor for a particular product/ system/ assembly/section of Specifications and specifically endorsed by warrantor to Owner.
 2. Warranty shall include for proper performance of the portion of the Work as defined by the scope of the applicable specification section to the extent that the design and Contract Documents permit such performance.
 3. Warranty shall be provided by Subcontractor unless warranty is specified to be provided by product manufacturer.
 4. The Owner shall promptly give the warrantor notice in writing of observed defects and deficiencies which occur during the warranty period.
 5. Warranty shall commence at date of Substantial Performance of the Work.
 6. Warranty specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranty do not relieve Contractor of obligations under requirements of the Contract Documents.
 7. Submit warranty on warrantor's standard form endorsed to Owner which includes the following information:
 1. Name and address of Project.
 2. Warranty commencement date (date of Substantial Performance of the Work).
 3. Warranty period.
 4. Specific warranty terms as required in applicable portion of Contract Documents.
 5. Name and title of authorized signing officer and seal of warrantor.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

PART 1 GENERAL

1.1 Related work

1. Section 01742 Waste Management & Disposal

1.2 General Scope

1. Selective demolition of interior partitions, systems, and building components designated to be removed.
2. Selective demolition of exterior facade, structures, and components designated to be removed.
3. Protection of portions of building adjacent to or affected by selective demolition.
4. Removal of abandoned utilities and wiring systems.
5. Notification to Owner of schedule of shut-off of utilities which serve occupied spaces.
6. Pollution control during selective demolition, including noise control.
7. Removal and legal disposal of materials.
8. Protection of designated site improvements and adjacent construction.
9. Salvage of designated items.
10. Interruption, capping or removal of utilities as applicable.

1.3 Hazardous Material

1. It is not expected that hazardous materials will be encountered in the Work.

1.4 Submittals

1. Submit under provisions of Section 01 30 00 - Administrative Requirements
2. Schedule: Submit for approval selective demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility service.

1.5 Quality Assurance

1. Codes and Regulations: Comply with governing codes and regulations. Use experienced workers.

1.6 Pre-Installation Meeting

1. Convene minimum two weeks prior to starting work of this section.

1.7 Sequence

1. Immediate areas of work will not be occupied during selective demolition. The public, including children, may occupy adjacent areas.
2. No responsibility for buildings and structures to be demolished will be assumed by the Owner
3. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

not applicable

PART 3 EXECUTION

3.1 General

1. Demolition Operations: Do not damage building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner, shall be removed from structure. Storage or sale of items at project site is prohibited
2. Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished
3. Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having jurisdiction. If necessary, provide temporary utilities
4. Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.
5. Security: Provide adequate protection against accidental trespassing. Secure project after work hours
6. Demolish and remove existing construction only to the extent required by new construction and as indicated in the documents.
7. Also, demolish or dismantle work or elements when this is required to provide access to concealed elements to be modified and to allow the modification work to be performed properly and efficiently. Keep such work to a minimum.
8. Ensure also that the dismantling of work or elements, where required, is performed carefully and without damaging them, so that they can be reinstalled, to the extent possible, as they were before the work was performed.
9. Do not demolish any structural element except where required by the structural drawings and specifications.
10. Remove existing equipment, services and obstacles where required for finishing or making good of existing surfaces, and put back in place as the work progresses.
11. Demolish to minimize dusting. Wet down materials as needed.
12. Demolish masonry and concrete elements in sections of suitable size to facilitate handling during removal from site. Remove large and heavy work and objects and carefully lower them to the ground.
13. Remove floor finishes such as concrete and tile down to structural slab.
14. Demolish interior partitions down to the structural floor slab including, where required, the cove bases.
15. Where required, saw masonry partitions which abut exterior walls over their entire height prior to demolishing them to avoid disturbing the interior face of the exterior walls. In all cases, once the demolition of the partition has been completed, break off the remaining pieces by hand until the surface is flush, without weakening the wall and its finish.

16. Saw partially demolished partitions and ceilings over entire height or, for ceilings, over width required to avoid disturbing the rest of the work to be patched.
17. At the end of each work day, leave work in safe conditions so that no part is in danger of toppling or falling. Seal off the portions which will not be demolished to protect the interior at all times against intrusion.
18. Unless otherwise specified, remove demolished materials from the worksite in accordance with the requirements of the competent authorities.
19. Collect all materials defined as contaminated or hazardous by the competent authorities for environmental protection and take all required safety precautions while removing them from the worksite.
20. It is prohibited to sell or burn demolition materials on the worksite.

3.2 Restoration

1. Restore surfaces and work located outside of the demolition zones to the condition in which they were found prior to the commencement of the work or to the condition in which the adjacent, unaltered surfaces are found, as indicated.

3.3 Schedule

1. Items for Protection During Demolition and Construction:
 1. Existing electrical panels & services
 2. Existing demising walls & Fire Rating
 3. Existing HVAC ducting & mechanical services
 4. Existing sprinklers pipes
2. Items to be Salvaged for Reinstallation: (None)
 1. sprinklers
3. Items to be Salvaged for Delivery to Owner:
 1. Overhang door
 2. Metal sink
 3. Bollards
 4. The existing door of office # 192
 5. The existing Exit metal door to be removed from space #188
4. Utilities Requiring Interruption, Capping, or Removal:
 1. Electric
 2. Heat
 3. Water
 4. Gas

3.4 Cleaning

1. Upon completion of demolition work, remove waste materials, restore surfaces to their original condition, and leave worksite clean.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Submittals

1. Shop Drawings: submit in accordance with Section 01 33 00.
 - 1.1. Indicate materials, core thickness, finishes, connections, joints, methods of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - 1.2. Include seal of a Registered Professional Engineer (Civil-Ontario) for Work which resists horizontal and vertical loadings such as stairs, railings, balustrades, lintels and similar framing and supports designed to the requirements of the Ontario Building Code.

1.2 Delivery, Storage and Handling

1. Label or tag materials supplied for installation by others to indicate its function, location in building and shop drawing designation.
2. Deliver materials to location designated and to meet requirements of construction schedule.
3. Carefully protect all materials and finishes from damage during delivery, storage and handling and from the time of installation until final finishes are applied or to final cleanup.

PART 2 PRODUCTS

2.1 Materials

1. Angle Lintels: to ASTM A666, Grade 316 stainless steel.
 - a) Provide 6" (150 mm) bearing at ends.
 - b) Weld or bolt back-to-back angles to profiles as indicated.
 - c) Supply to mason for building in.
2. Decorative Warning Surface (if Any): Advantage Cast Iron tactile walking surface indicator meeting ASTM A-48, Class 35B grey cast iron, Size 24" x 24" as manufactured by Kinesik Engineered Products Inc.
 - a) Install cast-in-place tile in accordance with manufacturer's written instructions and in coordination with Section 03 30 00.
 - b) Ensure concrete has been cast and finished true and smooth to required dimensions and slope prior to tile placement.
 - c) Place tile into fresh concrete and tamp to ensure that top of domes are level to adjacent concrete. Do not step on tiles.

PART 3 EXECUTION

3.1 Erection

1. Take site measurements to ensure that Work is fabricated to fit surrounding construction and in accordance with drawings.
2. Erect metal Work square, level, plumb, straight and true, accurately fitted, with tight joints and intersections.
3. Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, straps, anchor bolts, bar anchors, expansion bolts and shields and toggles.
4. Except where otherwise indicated or required, use welded connections wherever possible to provide a rigid structure.
5. Insulate between dissimilar metals; or between metal and masonry or concrete with bituminous paint or other approved method to prevent electrolysis.
6. Deliver to appropriate trades those items to be cast into concrete or built into masonry together with setting templates.
7. On completion, all surfaces shall be cleaned of dirt that results from delivery, storage or installation.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 References

1. CAN/ULC S702, Type 1 thermal mineral fibre insulation.
2. CCSB/71 GP-24 M flexible adhesive for polystyrene insulation.

1.2 Delivery, Handling & Storage

1. Package and label insulation materials to designate manufacturer, type, density and insulation value and reference standard specification number, if applicable.
2. Store insulation materials in a dry area, protected from wetting, damage and traffic.
3. Packages of fire rated materials to bear fire underwriter's labels.
4. Observe manufacturer's requirements for delivery, storage, and handling.

PART 2 PRODUCTS

2.1 General

1. Provide insulation to thicknesses and/or insulation values shown on the drawings unless specified otherwise.

2.2 Materials

1. Walls Insulation: R20 flexible Pink Next GEN fiber glass insulation for metal buildings, from Owen Corning or equal, minimum thickness 6"
 - 1.1. Complies with ASTM C665
 - 1.2. Classified non-combustible as tested in accordance with ASTM E136 (unfaced only)
 - 1.3. Unfaced PINK Next Gen™ Fiberglas™ insulation is acceptable for use in ICC building construction types I through V;

PART 3 EXECUTION

3.1 General

1. Verify that substrate is flat, sound, clean, and free of oil, grease, objectionable air surface voids, materials or substances that may impeded adhesive bond.
2. Install insulation and other materials in accordance with manufacturer's specifications, except where indicated, or specified otherwise.
3. Install insulation after building substrate materials are dry.
4. Install insulation to maintain continuity of thermal protection to building elements and spaces.

5. For optimum insulation performance, the building thermal barrier (insulation) should be in continual alignment with the building air barrier. In framed cavities, the product thickness should match the depth of the framing members.
6. Follow the local, applicable building code(s) to determine the need for and placement of a vapor retarder
7. Building, electrical, fire and other applicable codes shall be complied with. All heat emitting devices, such as fuel burning appliances, chimneys, pipes, ducts and vents to these appliances shall maintain a minimum clearance of 51 mm (2") between these devices and the insulation. Recessed light fixtures, unless designed for the purpose, shall not be installed in insulated ceilings.
8. Deliver products in their original packages, and store in enclosed shelter.
9. Shelter-unused packages from the elements.
10. Ensure applicator's personnel wear protective equipment such as breathing mask (dust-proof type mask), eye protection (safety goggles or eye glasses), and skin protection (gloves, long-sleeved shirts, and pants) when handling and applying materials. Wash with soap and warm water after handling. Wash work clothes separately and wipe out washer.

3.2 Installation

1. Install insulation following review of substrate surface by the Consultant.
2. Assure that surfaces to receive insulation are dry and free of dew, frost, voids, loose material, oil, grease and other material detrimental to bond.
3. Insulation should be installed just before the interior finish is applied.
4. Other trades and associated work, such as electrical, plumbing, and mechanical, should complete their installations prior to the installation of Fiberglas™.
5. Framing cavities and surfaces where Fiberglas™ Insulation will be installed should be dry and free of construction debris.
6. Stage insulation packages (unopened) and any accessory materials throughout the site prior to beginning any installation.
7. Air Sealing Prior to installing insulation, the following areas should be air sealed
 - i) Seal all joints and gaps in exterior sheathing.
 - ii) Seal all penetrations through exterior sheathing and framing members.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01320 - Construction Progress Documentation
2. Section 01560 - Temporary Barriers and Enclosures
3. Section 01353 - Special Procedures Traffic Control

1.2 Section Includes:

1. Exterior Insulating Finish System (EIFS); with positive moisture drainage and water resistive barrier.
2. Air and water resistive barrier / vapour barrier membrane related to EIFS assembly.
3. Architectural mouldings and accessories.
4. Seal joints within the work of this section in accordance with Section 07 92 00, except where otherwise specified and at abutting joints between this section and the work of other sections.
 1. Dual barrier sealant system.
5. Air barrier membrane transitions and connections between air barriers of adjacent wall and roofing systems traffic.

1.3 Quality Assurance

1. Execute the work of this section only by a specialized Subcontractor with equipment and skilled workers trained by manufacturer supplying products to this section, and is known to have been responsible for satisfactory work similar in size and class to that specified during a period of at least the past 10 years.
2. Execute work of this section by Subcontractor trained and certified by EIFS system manufacturer.
3. The manufacturer shall be a member in good standing of the EIFS Council of Canada.
4. Conduct quality control in accordance with Section 01 45 00.
5. Conduct quality control in accordance with Section 01 45 00. Independent inspection and testing company shall attend the pre-installation meeting.
6. EIFS manufacturer's field review to be in accordance with Section 01 45 00.

1.4 Submittals

1. Submit required submittals in accordance with Section 01 33 00.
2. Product data sheets: Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.
3. Test reports: Test Reports: When requested, submit copies of selected test reports verifying the performance of the system.
4. Shop drawings:

1. Submit drawings showing locations and details of control and expansion joints, section of entire system, section of each parapet (if there are any), reveal and coping condition, flashing conditions, installation sequence, interface with doors and windows, and all other installation and fabrication information. Indicate layout of required fasteners.
2. Manufacturer and Subcontractor to jointly sign shop drawings.
3. Manufacturer shall review drawings and recommend/modify control joint locations.
5. Samples:
 1. Submit duplicate 600 mm x 600 mm (24" x 24") samples of final coating on sheathing board, of each texture and colour, and reveal profile, to be used in the work for acceptance by Client/Consultant.
 2. Consultant may request multiple colours for review. Resubmit samples as requested.
 3. If the proposed work is to match existing building colors, then the Contractor is to submit a sample with a color which matches the existing building color
6. Mock-ups:
 1. Provide mock-up showing components of assembly, including reveal profiles, flashings, assembly layers, control joint details, expansion joint details, and interface details.
 2. Mock-up size and location: Full corner suite, floor to floor, from control joint to control joint, showing typical detail conditions. Mock-up location as directed by Consultant.
 3. Approved mock-up may be used as part of the completed work.
 4. If more control/expansion joints are recommended by manufacturer than are indicated in the Contract Documents, they shall be located with Consultant's approval. There shall be no additional costs for such additional control/expansion joints.

1.5 Performance Requirements

1. Comply with the following performance requirements:
 1. Design and Provide work of this section in accordance with Exterior Insulation and Finish Systems Best Practice Guide Building Technology, latest edition.
2. Comply with the following building code and the requirements:
 1. Protection of exterior face of building.
 2. Combustible components in exterior walls.
3. EIFS system shall be listed for the following fire tests:
 1. CAN/ULC S101-04.
 2. CAN/ULC-S114-05.
 3. Metal fasteners shall be corrosion resistant.
4. Provide drip detail over windows and door heads, copings, and as detailed.
5. Reinforce corners at openings with extra coat of mesh.
6. Provide weather-tight sealant joints for work of this section.
7. Wall system to utilize drain systems to positively drain water from within wall system to exterior, slope of not less than 6:12 to exterior.
8. Wall system to utilize profiles to positively drain water from top surfaces to exterior, slope of not less than 6:12 to exterior.

1.6 Environmental requirements

1. Conform to manufacturer's written documented temperatures, relative humidity, and substrate moisture content and temperature for application of materials of this section.

1.7 Delivery, Storage & Handling

1. Deliver materials in the original, unopened packages with labels intact. Upon arrival, inspect materials for damage, and manufacturer informed of any discrepancies.
2. Store materials in a cool, dry location, out of sunlight, protected from weather and other damage, and at a temperature not less than 7°C, and in accordance with manufacturer's specifications.

1.8 Warranty

1. Warrant work of this section for a period of 5 years, in accordance with Section 01 78

PART 2 PRODUCTS

2.1 Acceptable Manufacturer

1. Any of the following, or equal:
 1. Durabond Products Ltd.
 2. DuRock Alfacing International.
 3. Dryvit Canada.

2.2 Acceptable Product

1. Acceptable Products; EIFS system with EPS polystyrene insulation board with positive moisture drainage including water resistive barrier:
 1. Adex 'Adex-RS'.
 2. Akrilon 'Akrilon-RS'.
 3. DuRock 'PUCCS'.
 4. Dryvit 'Outsulation PD (NC)'.
 5. Senergy 'Senerflex Channeled Insulation Design'.
2. Cladding system shall be constructed in accordance with manufacturer's written specifications, using cladding system manufacturer's proprietary materials.
3. System components shall be as recommended by the manufacturer and include necessary materials to complete the work of this section. Conflict between such recommendations and the Contract Documents shall be resolved at no additional cost to the Owner before commencing the work.

2.3 EIFS Components

1. General: Use only Products forming part of EIFS system as approved and listed for use by the EIFS manufacturer.
2. Air/water resistive barrier components:
 1. Non-cementitious air, water, and vapour barrier membrane: Factory mixed, fully formulated water-based material for use over gypsum or cement based sheathings (not for use over wood sheathing).
 2. Air, water, and vapour resistive barrier transition membrane: Flexible self- adhering bituminous transition membrane for perimeter of exterior openings, and transition between dissimilar substrates: flashing membrane and primer; for taping movement joints at exterior sheathings, transitions between dissimilar substrates and for continuity of the air barrier membrane.
3. Flashing materials; to protect substrate edges at terminations:
 1. Liquid applied: Flexible water-based polymer material, ready for use.
 2. Sheet type: high density polyethylene film backed with a rubberized asphalt adhesive complete with substrate surface conditioner.
4. Drainage strip and drainage track adhesive: moisture cure, urethane-based adhesive.
5. Drainage track, vents: UV treated plastic.
6. Adhesives: Used to adhere the insulation to the air/water-resistive barrier, shall be compatible with the water resistive barrier and the insulation.
7. Insulation board:
 1. Profiled EPS: 16 kg/m³ (1 lb/ft³) density, expanded polystyrene to Type I to CAN/ULC S701, with factory-cut vertical drainage channels and pressure moderation chambers, minimum depth 10 mm.
 2. Foamed-in-place Insulation: Class 1, single or two component, polyurethane foam with flame spread rating of 25, fuel contributed 0 and smoke developed 20. Must be ozone friendly and containing no fluorocarbons to CAN/ULC S710.1-05.
8. Mechanical fasteners: Steel screw type fasteners with corrosion resistant finish, of type and size to suit substrate, complete with plastic washers, and to be supplied or recommended by the EIFS manufacturer.
9. Base coat:
 1. Cementitious: factory mixed dry blend cementitious, copolymer-based product, field mixed with water.
10. Reinforcing mesh:
 1. Fibre mesh with symmetrical, interlaced glass fibre made from twisted multi-end strands and coating to be alkaline resistant, proprietary to textured finish system manufacturer, to the following weights, ASTM D579:
 - a) Standard-weight reinforcing mesh and detail mesh for reinforcing corners at openings, corners, and details: 168 g/m² (6 oz/yd²).
 - b) Medium-heavy (intermediate) weight reinforcing mesh: 349 g/m² (11 oz/yd²)
 - c) High-impact mesh: Open weave glass fibre mesh, 694 g/m² (15 oz/yd²).
 2. Mesh shall be shift proof, with trimmed roll edges to minimize building on overlapped seams.

11. Finish:
 1. Exterior grade, ready-mixed, acrylic-based wall coatings, proprietary to textured finish system manufacturer.
 2. Texture and colours:
 - a) As selected by Consultant from full range available.
 - b) Manufacturer shall match colour samples from full colour range of any major paint manufacturer.
12. Sealants: Provide sealants in accordance with Section 07 92 00.

PART 3 EXECUTION

3.1 Substrate

1. Confirm environmental and conditions at the Place of the Work are suitable for installation of system. Verify surface conditions with EIFS manufacturer.
2. Substrate shall be sound, dry, connections are tight; has no surface voids, projections, or other conditions that may interfere with the EIFS system installation or performance.
3. Substrate shall be within 3.2 mm (1/8") tolerance within 2440 mm (8 ft) radius; by straightedge method.

3.2 Preparation

1. Prepare substrate surfaces in accordance with manufacturer's written instructions.
2. Substrate shall be prepared as to be free of foreign materials, including oil, dust, dirt, form-release agents, efflorescence, paint, wax, water repellents, moisture, frost, and other condition that may inhibit adhesion.
3. Protect adjacent surfaces from damage resulting from work of this section.
4. Protect finished work at end of each day or on completion of each section of work from water penetration.
5. Protect completed installation from moisture for 48 hours minimum.
6. Protect top of parapet walls, and opening until flashings and trim, are installed.
7. Coordinate work of other Subcontractors and with the Contractor's construction schedule.
8. Reinforce substrate joints, cracks, cold joints, as required.
9. For masonry and concrete substrates prepare substrate surface by removing projections and loose particles.
10. For masonry and concrete substrates apply minimum 2 coats fibre-reinforced levelling base coat over manufacturer approved substrate so that holes are filled and surface is made flush and level to substrate tolerances specified above.

3.3 Installation

1. Apply work of this section in accordance with EIFS manufacturer's specifications and written instructions, and to requirements of this section.
2. Where manufacturers' printed instructions are not available, or a situation is ambiguous or unique, consult the manufacturer's technical representative and the Consultant at the Place of

the Work to review the situation and make clarifications. Instructions will be confirmed in writing by the Consultant and/or manufacturer.

3. Commencement of application over substrate shall imply acceptance of substrate conditions.
4. Air/water resistive barrier membrane:
 1. Install detail mesh at vertical and horizontal sheathing board joints.
 2. Trowel apply continuous layer of air/water resistive barrier membrane over the entire EIFS substrate area at manufacturer's recommended rate of application.
 3. Install 305 mm (12") strip of flashing membrane to maintain continuity of the air/water resistive barrier.
 4. Allow air/water resistive barrier membrane to cure for 24 hours prior to the placement of transition membrane and insulation at areas shown on details and reviewed shop drawings.
 5. Wrap air, water, and vapour resistive barrier transition membrane from exterior to inside face of openings, lap onto adjacent air barrier membrane assemblies, and comply with air barrier general requirements in Section 07 27 00.
5. Detail reinforcing:
 1. Provide pre-wrapped starter strips.
 2. Provide detail reinforcing mesh and wrap around and reinforce edge of insulation board (and decorative trim) at terminations of the system and along both edges of all expansion/control joints.
 3. Install the detail reinforcing fabric to the substrate with adhesive prior to installation of the insulation board.
 4. Place the pre-measured and cut strip of detail reinforcing mesh over a ribbon of adhesive, 50 mm (2") wide by 19 mm (3/4") thick. Press mesh into place and smooth out ensuring that the mesh is fully embedded into the adhesive.
 5. Install the detail reinforcing mesh so that minimum of 100 mm (4") will be embedded under the insulation board and the remainder returned onto the edge and then onto the face board.
6. Drainage vent of weep screed:
 1. Install drainage vent channels or weep screed as required at the base of EIFS wall sections.
 2. Install with fasteners and/or adhesive to provide a continuous strip at system termination at grade, above roof and at openings or vent the sealed joint at 610 mm (24") on centre.
7. Locate control and expansion joints in accordance with reviewed shop drawings and to written recommendations of EIFS manufacturer. Locate control joints at maximum 9 m (30') on centre vertical and 3050 mm (10') on centre horizontal, unless otherwise indicated.
8. Adhesive/drainage layer and insulation; EPS insulation system:
 1. Utilizing a 12.7 mm (1/2") notched trowel apply the adhesive to the insulation boards to form vertical ribbons. Use sufficient pressure such that the board's, surface is visible between the ribbons.
 2. Immediately after applying the insulation adhesive, before initial set begins, firmly press the insulation board into place. Begin installation at one end, from a baseline, to form an uninterrupted surface.
 3. Install the insulation boards to the substrate in running bond pattern and with joints offset with respect to joints in the substrate by a minimum of 150 mm (6") and with the pre-machined vertical channels in alignment. Install vent boards at system terminations and

- boundary boards at corners and at top and sides of each compartment; in accordance with manufacturer's installation instructions.
4. Interlock board joints at corners.
 5. Cut and pre-wrap insulation boards to fit around openings and penetrations. Use L-shaped boards to avoid aligning the insulation board edges with the corners of openings.
 6. Butt the insulation boards to moderate tight fit. Ensure a full thermal insulation barrier throughout.
 7. Gaps occurring in or between the insulation boards shall be filled with foamed-in-place insulation.
 8. Provide reveals in insulation boards in accurate alignment over the entire wall surfaces. Ensure reveals are true to size, straight, plumb and level throughout.
 9. Rasp the entire insulation surface and edges to a tolerance of not more than 3.2 mm (1/8") in 3050 mm (10 ft).
9. Cap flashing and flexible flashing membrane shall be installed as soon as possible after installation of EIFS wall system. Coordinate installation with Contractor and work of Section 07 62 00.
10. Joints:
1. Provide expansion joints in alignment with building expansion joints.
 2. Install expansion joints at locations where dissimilar substrates meet.
 3. Install expansion joints at locations of maximum stress.
 4. At each floor level install vented horizontal joint.
 5. Install control joints and/or reveals horizontally and vertically to divide the wall surface into panels of not more than 20 m² (215 ft²). Neither dimension within the panel should be greater than 2.5 times the other.
 6. Unless otherwise noted, provide joints 19 mm (3/4") wide.
11. Joint Sealants:
1. Provide sealant to joints within EIFS system, including joints where EIFS system interfaces with other adjacent materials and assemblies.
 2. Sealants shall be installed after completion of basecoat, and before installation of finish coat, in accordance with Section 07 92 00. This section shall be responsible for workmanship of sealants applied to work of this section.
 3. Dual barrier sealant system to be 2 stage type joint, to 'Rainscreen Principle', vented immediately below each horizontal panel joint, at vertical joint.
12. Finish coat:
1. Apply finish coat to texture and colour as approved by Consultant. Finished appearance and quality shall match approved mock-up and samples.
 2. Prior to application of finish coat primer, allow base coat to dry hard in accordance with EIFS manufacturer's requirements.
 3. Uniformly apply primer and finish to entire surface (except expansion and control joints). Primer to be dry to touch prior to application of finish coat. Substrate shall not be visible through the applied primer. Allow minimum 4 hours for curing prior to application of finish coat.
 4. Apply finish coat to thickness required for type of finish specified.

5. Apply and level finish coat during same operation to minimum obtainable thickness consistent with uniform coverage.
6. Maintain wet edge on finish coat by applying and texturing continually over wall surface.
7. Work finish coat to corners, joints, or natural breaks. Do not allow material to set up within an uninterrupted wall area.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 07900 Joint Sealers

1.2 References

1. Generally, observe the flashing principles and sheet metal Work as described and illustrated in the Canadian Roofing Contractors Association (CRCA) manual.
2. Shop and field Work to be in accordance with good sheet metal practice, by skilled tradesman under competent supervision.

1.3 Inspection & Testing

1. Include the Work of this section in the Inspection of Roofing.

1.4 Submittals

1. Provide samples of sheet metal materials, colour, finish, design, finished profiles, joints and the like as requested in accordance with Section 01300.

1.5 Delivery, Storage & Handling

1. Protect sheet metal during delivery, storage and handling to prevent rusting, staining, abrasion of finish coatings, bending and denting.
2. Protect surfaces of pre-coated metal to prevent scratching.

1.7 Warrenty

1. Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty, The Work of this section is to form a part of the warranty on flashing work in this project, but for a period of one (1) year from date of Substantial Performance.

PART 2 PRODUCTS

2.1 Materials

1. Metal Flashings:
 - 1.1. Galvanized steel 0.457 (24GA) core nominal
 - 1.2. Thickness conforming to ASTM A528, Z275 zinc coated galvanized to G-90 by Hot-dip process.
2. Finish:

- 2.1. Stelco series "8000" OR
- 2.2. Valspar "Weather-x"
- 2.3. Colour: selected by Consultant from Manufacturer's Standard Range.
Coordinate with pre-finished window frame colour.
3. Isolation Coating: Alkali resistant bituminous paint.
4. Plastic Cement: To CGSB 37-GP-5M.
5. Underlay for Metal Flashings: Equal to Bakor Blueskin PE 200 Ht: self-seal, self- adhering membrane.
6. Solder: To ASTM B32-76, 50% tin and 50% lead.
7. Flux: Resin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
8. Fasteners:
 - 8.1 To CSA B111-1974.
 - 8.2. Material: Of same material and finish as the metal being fastened.
 - 8.3. Size: Of length and thickness suitable for particular application.
9. Touch-Up Paint: As recommended by metal flashing and trim manufacturer.
10. Caulking: Equal to Dow Corning 790. Single component silicone base building sealant to CAN/CGSB 19-13-87M.
11. Cleats:
 - 11.1. Materials: Same as material being fastened.
 - 11.2. Thickness: Same as material being fastened.
 - 11.3. Size: Minimum width 1-1/2" (38 mm) and long enough to make at least a 2" (13 mm) interlock with sheet metal and to fold over nail heads.

2.2 Pre-Fabrication

1. Fabricate all possible Work in shop by brake forming, bench cutting, drilling and shaping. To CRCA details and as indicated.
2. Provide all accessories required for installation of Work of this section. Accessories to match in all respects Work with which they are to be incorporated.
3. Double back exposed metal edges on underside 1/2" (13 mm).
4. Form pieces in 8'-0" (2400 mm) maximum lengths; pre-coated steel to be formed in 12'-0" (3600 mm) maximum lengths.
5. Form sections square, true and accurate to size, to profiles indicated and free from distortion and other defects detrimental to appearance or performance. Mitre all corners.
6. Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

PART 3 EXECUTION

3.1 General

Install sheet metal work in accordance with CRCA recommendations.

3.2 Installation

1. Arrange sheet metal Work to provide adequately for thermal expansion and contraction.
2. Install sheet metal Work to prevent entry of water under service and all-weather conditions.
3. Do not form open joints or pockets that fail to drain water.
4. Back paint with bituminous paint sheet metal coming in contact with another kind of metal, masonry or concrete.
5. Use concealed fastenings except where approved otherwise before installation.
6. Install concealed cleats at 12" (300 mm) o.c. where required to fasten sheet metal. Secure each cleat to backing with two nails. Turn cleats back to cover nail heads and lock them into folded edge of metal being fastened.
7. Join sheet metal by slip lock seams to permit thermal movement. Space joints evenly where exposed. Lock seam and solder or caulk internal corners.
8. Caulk junctions of metal within the Work of this Section and where metal flashings are let into abutting materials provided under other Sections.

3.3 Field Quality Control

1. Inspection of flashing application will be carried out by a Testing Laboratory designated and paid for by the Contractor.

3.4 Clean Up

1. Following completion of the installations remove all surplus material debris and equipment from site.

3.5 Protection

1. Protect installed products until completion of project.
2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01 11 00 – General Conditions
2. Section 07 90 00 – Sealants
3. Division 21 – Fire Suppression
4. Division 22 – Plumbing
5. Division 23 – Heating, Ventilating, and Air Conditioning
6. Division 26 – Electrical

1.2 Section Includes

1. Applications of firestop systems including:
 1. Penetrations for passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire rated vertical barriers (walls and partitions), horizontal beams (floor/ceiling assemblies) and vertical service shaft walls and partitions.
 2. Safing slots gaps between edge of floor slabs and curtain walls.
 3. Openings between structurally separate sections of walls and floors.
 4. Gaps between tops of walls and ceiling or roof assemblies.
 5. Expansion joints in fire rated walls and floors.
 6. Openings and penetrations in fire rated partitions or walls containing fire doors.
 7. Openings around structural members which penetrate fire rated floors or walls

1.3 Reference Standards

1. American Society for Testing and Materials (ASTM):
 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 2. ASTM E814 Test Method for Fire Tests of Through-Penetration Firestops.
 3. ASTM E1966: Standard Test Methods for Fire Tests of Joints
2. National Fire Protection Association (NFPA):
 1. NFPA 70 National Electric Code
 2. NFPA 101 Life Safety Code
3. Underwriters Laboratories, Inc. (UL)
 1. UL 1479 Fire Tests of Through-Penetration Firestops
 2. UL 2079 Tests for Fire Resistance of Building Joint Systems.
 3. UL Fire Resistance Directory:
 - a) Fills, Voids or Cavity Materials (XHHW)
 - b) Firestop Devices (XHJI)

1.4 Submittals

1. Submit the necessary shop drawings and product data in accordance with sections 01 11 00 and 01 33 00.

2. Submit product data for the various specified products, including one copy that shall remain permanently on site. Product data must include the following information:
 1. Materials list of items proposed to be provided under this Section;
 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 3. Shop Drawings: Submit shop drawings showing layout, profiles and product components. Include UL Systems or other independent laboratory system classification number on shop drawings.
 4. Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.
 5. Certification from sealant manufacturers that their products are suitable for the use indicated and comply with specification requirements.

1.5 Quality Assurance

1. Performance Requirements: Provide firestop systems which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.
2. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
3. Applicator Qualifications:
 1. Applicator shall have at least three years' experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
 2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.
4. Single source responsibility for firestopping materials:
 1. Obtain firestop materials from single manufacturer for each different product required.
 2. .2 Manufacturer shall instruct applicator in procedures for each material.
5. Regulatory Requirements:
 1. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
 2. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
 3. For those firestop applications that exist for which no UL tested system is available through any manufacturer, a manufacturer's engineering judgement derived from similar independently tested system designs will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Manufacturer's engineer judgement drawings must follow requirements set forth by the International Firestop Council.

1.6 Delivery, Storage and Handling

1. Deliver the materials to the job site in the manufacturer's unopened containers, containing the UL classification label, with all labels intact and legible at time of use.
2. Store materials in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
3. Before handling, read product data sheets and material safety data sheets. Do not use damaged or expired materials.

1.7 Warranty

1. Deliver to the Consultant signed copies of the following written warranties against material failure:
 1. Manufacturer's standard warranty covering firestop materials.
 2. Applicator's standard warranty covering workmanship

PART 2 PRODUCTS

2.1 Manufacturer

1. AD Fire Protection Systems.
2. Hilti.
3. 3M.
4. Approved equal.

2.2 Material

1. Products/Systems Testing: UL Fire Resistance Directory, Fill, Void or Cavity Materials (XHHW) and Firestop Devices (XHJI) for listed products/systems
2. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the sealant manufacturer as compatible, subject to review by the Consultant.

2.3 Source Quality Control

1. Source Quality: Obtain firestop system products from a single manufacturer.
2. Manufacturer's Field Services: Upon Agency's request, provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions

PART 3 EXECUTION

3.1 Manufacturer's Instructions

1. Comply with manufacturer's product data including product technical bulletins, product catalog installation instructions and product packaging instructions

3.2 Examination

1. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
 1. Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper and timely completion.

3.3 Preparation

1. Surface Preparation: Prepare surface to receive firestop system products in accordance with manufacturer's instructions for surface preparation. .
 1. Verify that penetrations and joints are properly sized.
 2. Secure all pipe, conduit, cable and other items which penetrate firestop materials.
 3. Comply with manufacturer's instructions relative to temperature and humidity conditions, before, during and after installation of firestopping materials.
 4. Do not proceed until unsatisfactory conditions have been corrected.

3.4 Installation

1. Regulatory Requirements: Install firestop materials in accordance with published Through-Penetration Firestop Systems in UL's Fire Resistance Directory or the publication of another approved independent laboratory.
2. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of firestopping materials
 1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 2. Seal all joints to ensure an air and water resistant seal, capable to withstand compression and extension due to thermal, wind or seismic joint movement.
 3. Consult with mechanical engineer, project manager prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

3.5 Field Quality Control

1. Examine sealed penetration and joint areas to ensure proper installation before concealing or enclosing areas.
2. Keep areas of work accessible until inspection by applicable code authorities.
3. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades

3.6 Locations of Fire Stop & Smoke Seal

1. The fact that the drawings do not indicate all places to be filled does not relieve the Contractor of its responsibility to seal all places where such products are normally required to obtain a continuous fire resistant and/or smoke- and gas-tight barrier. This clause also applies for all other sections that refer to this section with respect to the supply and/or installation of firestops and smoke seals.
2. Install firestops and smoke seals specifically in the following places:

5. Joints between floor slabs and exterior finish systems (curtain-walls, precast concrete panels, etc.);
6. Joints at top of vertical fire separations;
7. Joints at intersection of fire separations;
8. Control and expansion joints in fire separations;
9. Joints around (and between) mechanical and electrical assemblies penetrating fire separations;
10. Joints around (and between) mechanical and electrical assemblies penetrating the protective finish of structural elements;
11. Openings provided in fire separations for future use.

3.6 Identification

1. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 1. The words: “Warning: Through-Penetration Firestop System – Do Not Disturb”.
 2. Contractor’s name, address and phone number.
 3. Designation of applicable testing and inspection agency.
 4. Date of installation.
 5. Manufacturer’s name for firestop materials.

3.7 Protection

1. Protection: Protect installed product from damage during construction

3.8 Clean Up

1. Remove surplus materials and debris, and clean adjacent surfaces immediately after installation.
2. Removing temporary dams after initial set of firestop and smoke seal materials.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 08500 Caulking Related to Glazing

1.2 Qualification

1. Installation by a recognized specialized applicator with at least 5 years' experience employing skilled mechanics trained and competent in all phases of sealant application.

1.3 References

1. ASTM C679 – Standard Test Method for Tack-Free Time of Elastomeric Sealants.
2. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
3. ASTM C920 – Elastomeric Joint Sealants.
4. ASTM C1193 – Standard Guide for Use of Joint Sealants.
5. ASTM D2202 - Standard Test Method for Slump of Sealants

1.4 Submittals

1. Provide in accordance with Section 01 33 00 - Submittal Procedures:
 - 1.1. Product data for silicone sealant and joint backing. Include material safety data sheets (MSDSs) and certifications showing compliance with specified standards.
 - 1.2. Shop drawings detailing sealant joints and indicating joint dimensions, materials, sealant profile, and size limitations.
 - 1.3. Manufacturer's color chart for selection by Architect.
 - 1.4. Manufacturer's instructions for installation and field quality control testing.

1.5 Delivery, Storage & Handling

1. Deliver and store materials in original wrappings and containers with Manufacturers' seals and labels intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 Environmental & Safety Requirements

1. Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
2. Do not install silicone sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.

3. Do not install sealant when temperature is less than [-29°C].

1.7 Warranty

1. Best & Better Choice Sealant – 20 year Non-Stain Warranty (DC 790, 795, 756 SMS)
2. From date of Substantial Performance. Provide sealant validation by the Sealant Weatherproofing Restoration Institute (SWRI).

PART 2 PRODUCTS

2.1 Materials

1. Sealant: Non-bleeding and capable of supporting their own weight except for the self-leveling type sealant for horizontal surfaces. Allow for special colours as selected by the Consultant.
2. Joint Backing Material:
 - 2.1. Vertical Surfaces: equal to Soft Rod and extruded polyolefin foam by Tremco Ltd.
 - 2.2. Horizontal Surfaces: equal to Standard Backer Rod closed cell polyethylene foam by Tremco Ltd.
3. Bond Breaker: pressure sensitive plastic tape, which will not bond to the sealant 3M #226 of #481 or Valley Industries #40 place at the back of the joint.
4. Masking, Primers, and Cleaning Solvents:
 - 4.1. Provide products compatible with each other, designed to suit the specific job conditions and as recommended by the sealant manufacturer.
5. Void Filler: Loose glass fibre.
6. Sealants: (types and applications)
 - 6.1. Single Component Silicone: Equal to ASTM C920, Type S, Class 40, use G, A, M, NT. Dow Corning Contractors Weatherproofing Sealant (CWS) or equal.
 - 6.1.1. Typical Locations:
 - Exterior hollow metal steel door frames and screens, both sides
 - Between existing masonry and adjacent new materials
 - 6.2. Medium Modulus, Moisture Curing, One Part Silicone Sealant: to ASTM C920, Classification MCG-2-25-A-L equal to Dow Corning 795, Dow Corning CWS, or Spectrem 2 by Tremco Ltd. Or equal. Use in glass-to-glass, glass to metal.
 - 6.3. Mildew resistant, one component silicone sealant: to ASTM C920 CAN/CGSB 19.13M equal to Dow Corning Tub, Tile, and Ceramic or Tremsil 200 White and Clear by Tremco Ltd. Use on fixtures, bathtubs and vanity tops
 - 6.3.1. Typical Locations:
 - Underside of rims of sinks between sink rims and counters

- Around pipes and conduits passing through walls and ceilings in washrooms. Conceal Sealant with escutcheons.
- Joints between counters/vanities and walls in washrooms
- Joints between urinals and walls in washrooms
- Joints between water closets and walls and floors in washrooms

6.4. Equivalent products by GE, Tremco and Degussa are acceptable. Indicate the manufacturer and proposed product.

7. Colour selection from Manufacturer's standard range. Color to be selected & approved by the architect or project administrator.
8. Cleaning material for surfaces to receive sealant as recommended by the manufacturer of sealant.

PART 3 EXECUTION

3.1 Examination

1. For unusual or complicated caulking conditions meet at the site with sealant manufacturer's representative to discuss procedures before commencing the Work.
2. Before commencing Work, verify at the site that joint configuration and surfaces have been provided as specified under Work of other sections to meet intent of sealant specification.

3.2 Protection

1. Protect installed Work of other trades from staining or contamination.

3.3 Preparation & Joint Surfacing

1. Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
2. Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter, which may impair Work.
3. Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
4. Ensure joint surfaces are dry and frost free.
5. Prepare surfaces in accordance with manufacturer's directions.

3.4 Priming

1. Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
2. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.5 Backup Material

1. Apply bond breaker tape where required to manufacturer's instructions.
2. Install joint filler to achieve correct joint depth and shape, with approx. 30% compression.

3.6 Mixing

1. Mix materials in strict accordance with sealant manufacturer's instructions.

3.7 Application

1. Sealant:
 - 1.1. Apply sealant in accordance with manufacturer's written instructions.
 - 1.2. Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - 1.3. Apply sealant in continuous beads.
 - 1.4. Apply sealant using gun with proper size nozzle.
 - 1.5. Use sufficient pressure to fill voids and joints solid.
 - 1.6. Form surface of sealant with bull bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - 1.7. Tool exposed surfaces before skinning begins to give slightly concave shape
 - 1.8. Remove excess compound promptly as Work progresses and upon completion.
2. Caulk But do not Restrict it to The Following:
 - 2.1. Exterior and interior hollow metal steel door frames: interior screens (both sides of frames).
 - 2.2. Exposed control joints in masonry walls; masonry wall corners; masonry-to- column junctures; joints in front of steel lintels bearing on exterior masonry jambs.
 - 2.3. Raked joints in junction of walls running at different angles, and at junction of walls to columns.
 - 2.4. Joints between washroom vanities, and other counters, urinals, and adjacent surfaces (use sanitary caulking).
 - 2.5. Wall to floor junctions and joints in floor, where typically indicated on drawings.
 - 2.6. At locations shown on drawings.
3. Curing:
 - 3.1. Cure sealants in accordance with sealant manufacturer's instructions.
 - 3.2. Do not cover up sealants until proper curing has taken place.

4. Cleanup:
 - 4.1. Clean adjacent surfaces immediately and leave Work neat and clean.
 - 4.2. Remove excess and droppings, using recommended cleaners as Work progresses.
 - 4.3. Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 07900 Sealants
2. Section 08700 Hardware
3. Section 08800 Glass & Glazing
4. Section 09900 Finish Painting

1.2 References & Standards

1. Doors and Frames: Construct to Canadian Steel Door Manufacturer's Association, "Canadian Manufacturing Specifications for Steel Doors and Frames" - latest edition, except where specified otherwise.
2. Installation to meet: HMMA "Installation Guide for Commercial Steel Doors and Frames".

1.3 Approved Manufacturers

1. Daybar Industries, Fleming Baron or Daley Doors or equal .

1.4 Submittals

1. Shop Drawings:
 - 1.1. Submit shop drawings in accordance with Section 01300, for Consultant's review before fabrication.
 - 1.2. Include a schedule identifying each unit with door marks and numbers as well as borrowed light frames relating to drawings and specifications.
 - 1.3. Prior to finalizing shop drawings coordinate all hardware with list supplied by hardware supplier.

1.5 Delivery, Storage & Handling

1. Brace frame units to prevent distortion in shipment, and protect finished surfaces by sturdy protective wrappings.
2. Store doors in protective wrappings in a secure dry location, to ensure that they are not damaged until hung. Install them only when Work has progressed to a stage when no damage will occur to them in place.

1.6 Warranty

1. Provided by Manufacturer for materials and workmanship in accordance with CSDFMA standard warranty for doors and frames.

PART 2 PRODUCTS

2.1 Materials

1. Steel:
 - 1.1. Standard: Galvaneal, conforming to ASTM A653, commercial steel (CS), Type 'B' coating designation A40 (ZF120), common designation paintable galvaneal for steel doors and frames.
 - 1.2. Exterior and Wet Areas: Galvanized steel conforming to ASTM A653 commercial steel (CS), Type B, coating designation G90 (Z275) for steel doors and frames. All exterior doors including door frames; to be thermally insulated to meet the building Code.
 - 1.3. To be free of scale, pitting, coil breaks, surface blemishes, buckles, waves or any other defects.
2. Door Cores:
 - 2.1. Standard Interior: honeycomb – structural small cell 1" (25mm) maximum kraft paper weight 80lb (3.63Kg) per ream minimum, density 1.03 pcf (16.5Kg/m²) sanded to the required thickness.
 - 2.2. Steel Stiffeners: Continuous vertical formed .032" (min) steel sections @ 6" oc welded to each face @ 6"oc. Fill voids between stiffeners with 1.5 pcf (24Kg/m²) fiberglass insulation to ASTM C66A.
3. Adhesives:
 - 3.1. Heat resistant, single component, polyurethane reactive (water) hot melt thermoset UL/WH approved.
 - 3.2. Interlocking Edge Seams: resin reinforced polychloroprene (RRPC) fire resistant, high viscosity seal/adhesives or UL/WH approved.
4. Primers: Rust inhibitive touch-up only. Formulated for direct-to-metal (DTM) application.
5. Anchors:
 - 5.1. Frames in Masonry: 18 GA adjustable steel "T" type anchors – 2" (50mm) x 10" (254mm) corrugated or perforated.
 - 5.2. Anchorage to Floor: Minimum 3 mm thick clip angles with 2 holes for expansion bolting to floor.
6. Miscellaneous:
 - 6.1. Door Silencers: Single stud neoprene/rubber type.
 - 6.2. Exterior Topcaps: To CGSB41-GP19M rigid polyvinylchloride (PVC) extrusion.

2.2 Frames Fabrication

1. General:
 - 1.1. Frames: 16-gauge welded construction. Equal to Fleming Baron "F" series setup and welded construction unless otherwise noted. Jamb depth= 83/4"

- 1.2. Blank, reinforce, drill and tap for mortised, templated hardware
- 1.3. Protect mortised cut-outs with steel guard boxes.
- 1.4. Reinforce frames where required, for surface mounted hardware. Drilling and tapping is by others, on site, at time of installation.
- 1.5. Provide for appropriate anchorage to floor and wall construction. Locate each wall anchor immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520mm (60") provide two (2) anchors, and an additional anchor for each additional 760mm (30") of height except as indicated below. Provide frames in previously placed concrete, masonry or structural steel with anchors located not more than 150mm (6") from the top and bottom of each jamb, and intermediate anchors at 660mm (26") on centre maximum. Fasteners for such anchors: Provided by others
- 1.6. Prepare each door opening for single stud rubber door silencers, three (3) for single door openings.
- 1.7. Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
2. Welded Type:
 - 2.1. Accurately mitred, securely welded on the inside of the profile.
 - 2.2. Cope butt joints of mullions, transom bars, centre rails and sill accurately and weld securely.
 - 2.3. Welding: To CSA W59-M.
 - 2.4. Grind welded joints to a smooth, uniform finish.
 - 2.5. Attach floor anchors securely to the inside of each jamb profile.
 - 2.6. Weld in two (2) temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.3 Doors Fabrication

1. General:
 - 1.1. Fabricate door faces without visible seams, free of scale, pitting, coil breaks, buckles and waves.
 - 1.2. Form edges true and straight with minimum radius.
 - 1.3. Blank, reinforce, drill and tap for mortised, templated hardware. At interior prepare for 1 1/2 pair butt hinges, at exterior 2 pair.
 - 1.4. Holes 12.7mm (.5") diameter and larger factory prepared in shop.
 - 1.5. Reinforce where required, for surface mounted hardware. Drilling and tapping is by others, on site, at time of installation.
 - 1.6. Fit top and bottom of doors with 16 GA inverted, recessed, channels spot welded to each face sheet @ 2" (50mm) oc.
 - 1.7. Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

- 1.8. Form each face from 16 GA steel.
- 1.9. Reinforce with vertical stiffeners, fully welded to each face sheet at 150 mm (6") oc.
- 1.10 Fill all voids between stiffeners with loose batt fiberglass insulation.
- 1.11 Continuously weld longitudinal edges for full height of door, fill, and grind smooth with no visible edge seams.
- 1.12 Fit with flush PVC top cap.
2. Standard Interior Doors:
 - 2.1. Electrical Connections: at electrical hardware locations shop install 19mm EMT conduit and 8, 12, 15 pin Elynx cables. Protect pin connectors during shipment and prior to installation.

PART 3 EXECUTION

3.1 Installation

1. Install doors and frames to CSDFMA Installation Guide.

3.2 Frame Installation

1. Set frames plumb, square, level and at correct elevation.
2. Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
3. Secure anchorages and connections to adjacent construction. At previously constructed openings in concrete or masonry use anchor bolts and expansion shield anchors.
4. Where exterior and interior steel frames will be installed prior to construction of the adjacent wall, provide each jamb with 1.6mm steel floor anchors. Provide each anchor with two (2) holes for mounting to the floor and securely weld to the inside of the jamb profile. Weld entire perimeter of anchor to frame. Spot welding is not acceptable.

3.3 Door Installation

1. Install doors and hardware in accordance with hardware templates and manufacturer's instructions.
2. Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
 - 2.1. Hinge Side: 1.0 mm.
 - 2.2. Latch Side and Head: 1.5 mm.
 - 2.3. Finished Floor, Top of Carpet [Non-combustible Sill] [And Thresholds]: 13 mm.
3. Adjust operable parts for correct function.
4. Coordinate installation with electric strike.

3.4 Finish Repairs

1. Touch up with primer finishes damaged during installation.
2. Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 07900 Sealants
2. Section 08800 Glass & Glazing

1.2 References & Standards

1. Fabricators of structural components to be certified by the Canadian Welding Bureau to CSA qualification codes as follows:
 - 1.1. Steel: CSA W47.1
 - 1.2. Aluminum: CSA W47.2
2. Air Filtration: Test in accordance with ASTM E330-90 Test Methods for Structural Performance of Exterior Windows. Curtain walls and doors by uniform static air pressure differences.

1.3 Submittals

1. Shop Drawings:
 - 1.1. Submit shop drawings in accordance with Section 01300. Indicate each type of window, frame and screen, extrusion profiles, plan swings of doors, elevations, connections, attachments, anchorage, reinforcing and details of hardware with catalogue cuts.
2. Samples: On request, provide samples of all products and materials included in this section.

1.4 Maintenance Data

1. Provide maintenance data for cleaning and maintenance of aluminum products for incorporation into maintenance manual.

1.5 Delivery, Storage & Handling

1. Package or crate units for shipment and storage before installation.
2. Protect finish surfaces by temporary protective coverings.
3. Provide methods for erecting units without causing damage.

1.6 Warranty

1. In addition to the standard Two (2) year warranty, manufacturer to submit a written Limited Lifetime Warranty for all aluminum doors with welded dual moment corner construction. Warranting the doors to be free from material defects in workmanship and material for the useful life of the door. Installer warrants the door installation commencing at Substantial Performance.

PART 2 PRODUCTS

2.1 Materials

1. This Specification is based on Alumicor entrance systems.
 - 1.1. Approved manufacturers: Alumicor, Kawneer, and Oldcastle, or equal.
2. Aluminum Extrusions: Aluminum Association Alloy AA 6063-T5.
3. Sheet and Plate Aluminum: Aluminum Association Alloy AA 1100, anodizing quality.
4. Steel Reinforcement: To CAN3 G40.21-M, Grade 300W.
5. Fasteners: 300 Series stainless steel or 400 Series stainless steel cadmium plated.
6. Weatherstripping: Elastomeric weathering of tubular shape and Work pile at meeting rails.

2.2 Product Material & Finishes

1. Aluminum Frames:
 - 1.1. Acceptable Material:
 - 1.1.1. Alumicor 1800 series (or equal) store front system 13/4" x 41/2" (44.5 x 114.3) nominal dimension, non-thermal, weatherseal, centered weather seal glazed, shear block.
 - 1.1.2. Windows type "W1" equal to Alumicor series 1800 or equal
 - 1.1.3. Finish – all frames and mullions to be anodized, color & finish to match existing building.
2. Aluminum Finishes:
 - 2.1. Finish exposed surfaces of aluminum components in accordance with Aluminum Association. Designation System for Aluminum Finishes.
 - 2.2. Electrolytically Deposited Colour Anodic Finish: Designation AA-colour to match sample.
 - 2.3. Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.
3. Steel Finishes: Finish steel clips and reinforcing steel with [steel primer to CGSB 1- GP-40M] [zinc coating to CSA G164].
4. Fabrication:
 - 4.1. Fabricate frames to profiles and maximum face sizes as shown. Provide minimum 22mm bite for insulating glazed units.
 - 4.2. Provide structural steel reinforcement as required.
 - 4.3. Fit joints tightly and secure mechanically.
 - 4.4. Conceal fastenings.
 - 4.5. Mortise, reinforce, drill and tap frames and reinforcements to receive hardware using templates provided from Door Hardware.
 - 4.6. Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

PART 3 EXECUTION

3.1 Examination

1. Site Verification: field measure all openings before fabrication.

3.2 Execution

1. Install all components in accordance with manufacturers' instruction and AAMA Store Front and Entrance Guide Specification Manual.
2. Take critical site dimensions to ensure that adjustments in fabrication or installation are provided for, that allowance is made for clearance from possible deflection of structure at heads, for expansion and contraction of component members and those clearances to adjacent constructions have been maintained.
3. Aluminum surfaces in contact with masonry or mortar to be coated several days in advance with black alkali resistant bitumastic enamel.

3.3 Installation

1. Install Work plumb, square, level, free from warp, twist and superimposed loads.
2. Secure Work in position.
3. Do not restrict thermal movement.
4. Where heads of frames, or screens, abut false ceiling or soffits, brace back to firm structure above. Do not fasten solely to the ceiling or soffit.
5. Be responsible that anchors and inserts, whether installed by the Work of this section or others, are adequate to meet the specified requirements

3.4 Glazing

1. Glaze aluminum frames in accordance with Section 08 80 00 – Glazing using Structural Silicone Glazing System.

3.5 Caulking

1. Apply sealant in accordance with Section 07 90 00 - Sealant. Conceal sealant within the aluminum Work except where exposed use is permitted by Consultant.

3.6 Protection & Cleaning

1. Protect installed product's finish surfaces from damage during construction.
2. On completion, leave all surfaces installed under this section clean, without need for further cleaning. Glass will receive final polishing under Section 01 71 10.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 07900 Sealants
2. Section 08110 Doors
3. Section 08700 Installation of Doors, Hardware & Electric Devices
4. Section 08710 Doors Hardware

1.2 References

1. American Architectural Manufacturers Association (AAMA) 101: Appendix Dissimilar Materials.
2. American Association of Automatic Door Manufacturers (AAADM).
3. American National Standards Institute (ANSI):
 - 3.1. ANSI A156.19: For Power Assist and Low Energy Power Operated Doors.
 - 3.2. ANSI 117.1: Accessible and Usable Buildings and Facilities.

1.3 Submittals

1. Product Data: Submit manufacturer's product data and standard details for automated doors, including fabrication, finishing, hardware, operators, accessories and other components of the Work. Include rough-in diagrams, wiring diagrams, parts lists, and maintenance instructions, as well as certified test data, where required.
2. Templates and Diagrams: Furnish templates, diagrams and other data to fabricators and installers of related Work, as needed for coordination of automatic entrance installation.
3. Shop Drawings:
 - 3.1. Submit shop drawing in accordance with Section 01 30 00.
 - 3.2. Include drawings for the fabrication and installation of automatic entrance doors and associated components of the Work. Indicate anchors, joint system, expansion provisions, hardware, and other components not included in manufacturers standard data. Include glazing details.

1.4 Quality Assurance

1. Installers Qualifications: factory trained technicians, certified by AASDM, and experienced to perform Work of this section.
2. Manufacturer's Qualifications: minimum (5) Five years successful experience in the fabrication of automatic doors of the type required for this project. Manufacturer capable of providing field service representation during installation, approving acceptable installer and approving application method.

1.5 Warranty

1. Manufacturer to warrant units against defects in material and workmanship for a period of one year from the date of Substantial Completion. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under Contract Documents.
2. Distributor to provide a one-year warranty for labour and transportation charges for defective parts replacements.

1.6 Delivery, Storage & Handling

1. Ordering and Delivery: comply with factory's ordering instructions and lead time requirements. Deliver component in original, unopened, undamaged factory containers with identification labels intact.
2. Storage and Protection: provide protection from exposure to harmful weather conditions and vandalism.

PART 2 PRODUCTS

2.1 Requirement

Electromagnetic locks with card reader that do not incorporate latches, pins or other similar devices to keep the door in the closed position are permitted to be installed on exterior Exit doors provided:

- a. the building is equipped with a fire alarm system, and the lock is installed as an ancillary device;
- b. all locking devices, except as permitted in e. and f., release immediately,
 - o upon initiation of an alarm signal in a fire alarm system,
 - o in the event of power failure, and
 - o upon actuation of a single manually operated switch accessible only to authorized personnel;
- c. a force of not more than 90 N applied to the primary door opening hardware initiates an irreversible process that will release the locking device within 15 s and not relock until the door has been opened;
- d. except as permitted in c., upon release, the locking device must be reset by the actuation of a manually operated switch accessible only to authorized personnel;
- e. a legible sign is permanently mounted on the door to indicate that the locking device will release within 15 s of applying pressure to the door opening hardware;
- f. the total delay in egress time by electromagnetic locks from any point within the floor area to an exterior open space is not more than 15 s;
- g. the primary door opening hardware for the electromagnetic lock is mounted on the door; and
- h. the electromagnetic lock and the primary door opening hardware are designed and installed in conformance with CAN/ULC-S533, Standard for Egress Door Securing and Releasing Devices and the locks and the associated hardware are labelled and listed by a recognized testing laboratory.

2.2 Equipment

1. Electric Operating Mechanism and card reader: Mounted and concealed in an extruded aluminum case for smooth and quiet operation.

- 1.1. Opening Action: by a 1/15 HP D.C. permanent magnet motor working through reduction gears to the output shaft.
- 1.2. Closing Action: by field replaceable spring. When the door is in the closing mode or fully closed, motor voltage shall not be required and will be off. The door can be manually operated with power on or off without damage to the operator. Supply an On/Off/Hold Open switch.
2. Operation: Automatic and/or Manual
 - 2.1. Automatic: Pushbutton switch actuates door open; door closes after time delay expires. Opening and closing force, measured 1" (25.4mm) out from the lock stile of the door, not to exceed 15 pounds (67 N) of force to stop the door when operating in either direction. Operator to include the following variable adjustments so as to comply with ANSI Standard A156.19: Opening speed – 4 to 6 seconds; Closing speed - 4 to 6 seconds
3. Door Units: type 7100 Surface Applied Operator with Connecting Arms – mount the operator header to the surface of the door frame or wall.
 - 3.1. Connecting Hardware: double arm arrangement that can either push the door or pull the door open to suit the job condition. When the operator mounting is on the pull side and adjacent wall is within 4" (102mm) of the door frame, specify a parallel arm.
4. Activating Device: located on each side of the opening as per ANSI Safety Standard A117 and the Ontario Building Code.
 - 4.1. Push Plate: 6" diameter (152mm) round, stainless steel switch.
 - 4.2. Manual: Push-N-Go™: activates automatic opening cycle; door closes after time delay expires (approximately 30% less than after pushbutton actuation).
5. Electrical: 120 VAC, 60 cycle, 1 phase, 15 amp.
6. Materials, Finishes and Fabrication:
 - 6.1. Extruded Aluminum: structural header sections – minimum 1/8" (3mm) thickness and to meet ASTM B221, 6063-T5 alloy and temper, anodized
 - 6.2. Finishes: to match frame finish.
7. Operator Construction: electromechanical
8. At Barrier Free Single Occupancy and Universal Washrooms Include:
 - 8.1. CX-WC-13 push button/locking/occupied indicator package
 - 8.2. CX-WEC-10 emergency call/alert accessory package
 - 8.3. All by Camden Door Controls or equal

PART 3 EXECUTION

3.1 Examination

1. Site Verification of Conditions: Verify that base conditions previously installed under other sections are acceptable for product installation according to manufacturer's instructions. Notify

the Contractor in writing of conditions detrimental to the proper and timely completion of work. Do not start work until all negative conditions are corrected in a manner acceptable to the installer and manufacturer.

3.2 Installation

1. General: by factory-trained mechanics certified by AAADM, and experienced to perform work of this section. Install door operators plumb, level and true to line. Provide support and anchor in place.
2. Dissimilar Materials: comply with AAMA 101, Appendix Dissimilar Materials by separating aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points.
3. Weather Tight Construction: Install header with joint filler or gaskets. Coordinate installation with wall flashings and other construction components.
4. Electrical: Electrical contractor to install all wiring to operator on a separate circuit breaker routed into header.

3.3 Adjustment, Cleaning & Protection

1. Cleaning: after installation, installer to take the following steps:
 - 1.1. Remove temporary coverings and protection of adjacent work.
 - 1.2. Remove construction debris from construction site and legally dispose of debris.
 - 1.3. Repair or replace damaged installed products.
 - 1.4. Clean product surfaces and lubricate operating equipment for optimum condition and safety.
2. Inspection and Adjustment: by AAADM certified technician to assure compliance with ANSI A156.10.
3. Advise Contractor of precautions required through the remainder of the construction period, to ensure that doors will be without damage or deterioration (other than normal weathering) at the time of acceptance.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 08100 Hollow Metal Doors & Frames
2. Section 08450 Automatic operations
3. Section 08710 Doors Hardware

1.2 Product Delivery, Storage & Handling

1. Accept delivery of doors and finish hardware.
2. Inspect doors for damage, upon delivery to the site. Hollow metal doors, which cannot be readily corrected by sanding, should be promptly returned to the manufacturer for replacement.
3. Store doors in a dry and clean location. Store in a temperature and humidity- controlled area. Stack 150mm off the floor.
4. Be responsible for any damage to doors and hardware from time of delivery until accepted by Owner after installation.

1.3 Jobsite Control & Distribution of Hardware

1. Provide locked room for storage of hardware at the job and a person responsible for the control and distribution of hardware.
2. It is the intent of this section to establish a single, competent source to be responsible for the installation of finish hardware, as per Section 08710. Faulty installation of electronic hardware shall therefore be traced back to this section.

1.4 Finishing Hardware

1. This section may include installation of butts, hinges, snaps, catches, signs, letters, latch sets, lock sets, automatic closers, strikes, bolts, escutcheons, and any other supplied items.
2. Locksets and Latch sets: mortise type.

1.5 Submittals

1. Shop Drawings:
 - 1.1. Submit hardware shop drawings in accordance with Section 01300.
 - 1.2. Indicate arrangement of installation, numbers of hardware units, direction, hardware material & finishes, type of installation requirements

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 Examination

1. Examine substrate surfaces to receive the Work of this Section and ensure that Work done as part of the Work of other Sections is complete and that there are no conditions which will adversely affect the performance of the Work. Notify the Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

3.2 Installation

1. Finish Hardware:
 - 1.1. Handling, Storage, and Installation: to ANSI/DH1 A115.1G.94 – for finishing hardware, doors and frames.
 - 1.2. Other trades installing hardware must follow all manufacturer's instructions including door closer adjustment, handing of locksets as required, and degree of door swing. Advise the Consultants if door frames are not square and plumb and prevent proper door installation
 - 1.3. Mount hardware to suit door elevations. Unless otherwise directed by the Consultant, install hardware heights indicated in finish hardware list.
 - 1.4. When requested, the hardware supplier will instruct the installer regarding the installation of unfamiliar items.
 - 1.5. Set, fit and adjust hardware according to manufacturer's directions. For trouble-free operation. After installation, adjust door closers for closing and latching speed and panic devices for proper latching. Protect installation from damage and paint spotting.
 - 1.6. Predrill kickplates and doors before attachment of plates. Apply with water resistant adhesive and countersunk steel screws.
 - 1.7. Locate hardware in accordance with requirements specified in Section 08710.
 - 1.8. Thresholds: site measure openings before cutting. Set thresholds on two continuous beads of caulking conforming to Section 07900.
 - 1.9. Door Closers and Holders: Install door closers so that door opening is unaffected, and to allow maximum swing.
 - 1.10. Weatherstripping of Doors:
 - 1.10.1. Install weatherstripping so that the entire perimeter of doors is tightly sealed. Secure in place with non-ferrous screws, in accurate alignment.
 - 1.10.2. Maintain integrity of weather seal at head of doors fitted with closers. Adapt weatherstripping as required to achieve specified performance and provide any necessary accessories.
2. Electronic Devices:
 - 2.1. Install all electric swing operator components, security components including door status switches, card readers, processors, transformers, and other electronic devices.

- 2.2. All Wiring: supplied and installed by Electrical Division 26 including conduit, boxes and other electrical appurtenances, including connections and terminations. Be responsible for ensuring that all wiring work is done in accordance with the suppliers wiring diagrams and directions.
- 2.3. Arrange for testing and commissioning of system by the distributor of the system. Submit a copy of reports to the Consultant.
- 2.4. Note: When installing electric strikes, it is imperative that doors are perfectly aligned to enable the bolt to close properly. Also ensure that rubber silencers do not impair the proper strike action required. Adjust or remove silencers, as necessary.
3. Hollow Metal Swing Doors:
 - 3.1. Hang doors to swing easily and freely on their hinges, to remain stationary in any position, and to close tightly and evenly on frames without binding.
 - 3.2. Provide 2mm clearance at head and jambs, 3mm clearance between pairs of doors, or panels and no more than 10 mm at floor. Provide clearance for specified finished flooring.
4. Locksets and Latches: Mortise type (cylindrical) hardware
5. Safeguard Keys: tag with opening number and deliver to Consultant at Substantial Performance.

3.3 Adjustment, Cleaning & Protection

1. Check and adjust each operating hardware item to ensure proper operation and function of unit.
2. Lubricate moving parts as recommended by hardware manufacturer. Use graphite type lubricant if no other is recommended.
3. Repair or replace defective materials and units which cannot be adjusted and lubricated to operate freely and smoothly. Re-install items found improperly installed.
4. Prior to date of Substantial Performance, re-adjust and re-lubricate as necessary.
5. Instruct Owner's designated personnel in the proper adjustment and maintenance of hardware and finishes at time of final hardware adjustment.

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 08100 Hollow Metal Doors & Frames
2. Section 08450 Automatic operations

1.2 General

1. Accept delivery of doors and finish hardware.
2. Submit required product data in accordance with the General Conditions and Divisions 00 and 01.
3. Submit product data for the specified products, including one copy that shall remain permanently on site. Product data must include the following information: .
 1. Description of products and their performance, including illustrations of the items;
 2. Installation recommendations; and .3 Ambient conditions.
 3. Include an index identifying each item and data sheet pagination

1.3 Samples

1. Submit samples in accordance with the General Conditions and Divisions 00 and 01. .
2. Submit a sample of each type of hardware piece specified.
3. Label each sample, indicating the corresponding paragraph in the hardware schedule shop drawing, the brand name and number, the finish and the supplier's signature.
4. Submit duly labelled samples to the Client Representative.
5. Keep samples at the field office throughout the duration of the work, and return them to the manufacturer once the work is completed.

1.4 Hardware Schedule & Shop Drawings

1. Submit a list of door hardware items in accordance with the General Conditions and Divisions 00 and 01.
2. List the hardware items submitted for examination, taking care to indicate the brand, model, material, function and finish, as well as any other relevant information. Provide complete numerical and written descriptions for each item.
3. Verify quantities in accordance with the Door Hardware & the Schedule of Openings, and the drawings

1.5 Certificates

1. Submit certificates in accordance with the General Conditions and Divisions 00 and 01.
2. Submit certificates stating that the products is approved conform to the required standards.

1.6 Wiring Diagram

1. Submit wiring diagrams in accordance with the General Conditions and Divisions 00 and 01.
2. Submit final wiring diagrams for review. Prepare diagrams compatible with the structure's security and fire alarm systems, and develop more detailed diagrams than those provided in the documents, by indicating their function. These diagrams shall meet the following requirements at a minimum:
 1. Indicate the connections between specified and related equipment in accordance with the specific instructions provided by each manufacturer of electrified components;
 2. Indicate the wire colours and terminal board numbers for the equipment
 3. Indicate the position of contacts and the state in which they are illustrated (e.g., the contacts are shown in locked-door mode);
 4. Indicate references to other system components, even if they are not provided in this section;
 5. Indicate word for word how each system works;
 6. Indicate the number of wires between each component and their size;
 7. Indicate electrical conduit elevations for future reference;
 8. Indicate connections to be done at the job site
3. Also, ensure that these diagrams are:
 1. Coordinated with the electrical works;
 2. Coordinated with the fire alarm works;
 3. Coordinated with the security works;
 4. Coordinated with the Client Representative to specifically meet their needs
4. Also, submit drawings indicating the location of power supply unit, as applicable.

1.6 Documents to submit

1. Provide the following documents for each hardware item:
 - (a) Maintenance records
 - (b) List of hardware items .
 - (c) Manufacturer's instructions .
 - (d) Drilling templates
2. Incorporate these documents into the manual prescribed in the General Conditions and Divisions 00 and 01

1.7 Template

1. Provide door and frame manufacturers with installation templates and complete instructions so that they may prepare their products to receive the hardware items specified in this section

1.8 Maintenance Equipment and Spare Parts

1. Supply maintenance equipment and spare parts in accordance with the General Conditions and Divisions 00 and 01.
2. Provide two (2) complete sets of the tools needed to maintain and adjust door closers, locks and accessories for emergency exits, and ensure that they are properly packaged and clearly labelled.
3. Hand over to the Client Representative any unused screws, tools, fasteners or parts normally supplied with the hardware items, and ensure that they are properly packaged and clearly labelled.

1.9 Delivery and Storage

1. Store finishing hardware items in a dry, clean, locked place
2. Package each hardware item, fasteners included, either separately or together for similar items, then label each package depending on the nature and destination of each item

1.10 Inspection

1. Once the work is complete, the Client Representative will inspect everything to confirm that the delivered and installed hardware is as established in the specifications and in accordance with the approved hardware shop drawings reviewed by the Consultant.
2. The following criteria shall be met for the inspection:
 - (i) Before requesting that the hardware be inspected, the Contractor shall conduct its own inspection and confirm this in writing at the time of the request.
 - (ii) If, in the Client Representative's opinion, the work appears to have been completed, the Client Representative will proceed systematically with the first inspection and, if applicable, issue an initial list of corrections to be made.
 - (iii) Once the Contractor has certified that any identified defects have been corrected, the work in question will be re-inspected by the Client Representative.
 - (iv) If the work is not complete and the Client Representative must issue other lists and conduct other inspections, the inspections will be at the Contractor's expense until the Client Representative has signed off on the work.
 - (v) The Contractor shall also provide the Client Representative with the necessary assistance during inspections.

1.11 Extended Warranty

1. For the work covered in this section, the warranty is to be extended to ten (10) years for door closers, five (5) years for the locks, three (3) years for the anti-panic hardware, and two (2) years for other hardware items.
2. Provide a written document prepared and signed by both the manufacturer and the installer, and issued in the name of Client, guaranteeing the work against any defects in materials, workmanship, installation and operation for the periods stipulated above.

PART 2 PRODUCTS

2.1 General

1. All hardware parts must be new and shall conform to the ANSI/BHMA standards in force.
2. If no ANSI/BHMA standard exists, the hardware part shall fulfill its function and be of the use recognized by the manufacturer.
3. all items shall be of rugged, institutional construction and shall be sourced from the same manufacturer.
4. For doors in fire separations, use only products approved for this purpose according to the fire protection rating required.

2.2 Door Hardware

1. Door's hardware shop drawings to be submitted by the Contractor for review & approval
2. Door's hardware for the renovated area to match the existing building hardware
3. Hardware Finishes of the renovated area to match the finishes of the existing building hardware

2.3 Fasteners

1. Supply screws, bolts, expansion shields and other fasteners necessary for the satisfactory securing and proper operation of hardware items, in accordance with the manufacturer's recommendations.
2. Exposed fastening components shall have the same finish as the hardware items.
3. Where a pull handle is required on one side of the door, and a push plate on the other side, supply the necessary fastening components and install them such that the handle is secured right through to the other side of the door. Install the push plate over the fasteners on the other side.
4. Use fastening components made from a material compatible with that through which they are driven.
5. Use only those fasteners that have been supplied by the manufacturer of the corresponding component.
 1. Even if the manufacturer provides them optionally, self-tapping and/or self-threading screws shall not be tolerated for the installation of hinges, anti-panic locksets, door closers and stop arms. All of these items must be installed with manufacturer-supplied machine screws, which shall be previously machined in the doors and frames.
 2. Any continuous hinges, any anti-panic locksets, any door closers and any stop arms not installed with the manufacturer-supplied machine screws and not previously machined in the doors and frames shall be rejected, and they will have to be reinstalled, which could potentially require replacement of the door and/or its frame.
6. Provide all required spacers.
7. All fasteners shall be anti-vandal type.

2.4 Cylinders & Key

1. Supply and install temporary cylinders with keys during construction.
2. CSC is responsible for the supply and installation of the high-security cores (other than those for use during the construction) and for the supply and administration of the keys.
3. All locks and cylinders shall be part of a high-security master key system, to be defined with the Client Representative.
4. All keys and cylinders shall be of the controlled keyway type, as is already in use.

PART 3 EXECUTION

3.1 Installation

1. The Contractor is entirely responsible for coordinating hardware items and door and frame details.
2. The installation of mechanical and electrical hardware includes coordination, commissioning of electrified hardware, and final adjustment.
3. Comply with the manufacturer's written specifications, recommendations and requirements, including technical bulletins and installation instructions provided in product catalogs and on packaging, as well as product datasheets.
4. Provide door and frame manufacturers with complete instructions and essential positioning templates so that they may prepare their products to receive the specified hardware items.
5. Supply and keep on site, with each hardware item, installation instructions and positioning templates developed by the manufacturer.
6. Except where stricter requirements are set out in the documents, install the hardware items in the standardized positions in keeping with the requirements of the Canadian Metric Guide for Steel Doors and Frames (Modular Construction) produced by the Canadian Steel Door Manufacturers Association.
7. Check the appropriate installation height with the Client Representative, in addition to any other special conditions.
8. Follow instructions and install hardware plumb, with manufacturer-supplied screws and bolts. Parts shall be embedded to be flush with door faces. Adjust moving parts so that the doors operate smoothly.
9. Install the door closers on the inside of the rooms. Where the specified models require installation on the outside, immediately notify the Client Representative and wait for instructions prior to installation.
10. When installation of a wall stopper is impossible, substitute it with a floor stopper of a comparable model and notify the Client Representative.
11. Check the floor conditions before ordering thresholds and stoppers, and supply the appropriate model based on actual conditions.
12. The installation of astragals must be coordinated with the Client Representative, where applicable.
13. Adjust the hardware components to meet the relevant requirements of applicable codes.
14. Once the final pieces have been installed, check that all the locks work.
15. Switch on the components or systems according to the required operation and functioning

3.2 Adjustment

1. Adjust hardware items, operation and control devices, and door closers so that they operate smoothly, are secure and provide a perfect seal upon closing.
2. Lubricate hardware items, operation and control devices, and all moving parts.
3. Adjust door hardware items so as to ensure perfect contact between doors and their frames.

3.3 Cleaning

1. Clean hardware items with a damp cloth and non-abrasive cleaning product, and polish according to manufacturer's instructions.
2. Remove protective film from hardware items, as applicable

3.4 Protection

1. Protect hardware until project hand-off

END OF SECTION

PART 1 GENERAL

Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section 08120 Aluminum Fames

1.2 Description of Work

1. Complete all exterior glazing included in the scope of work of this project as shown in the architectural drawings, the glazing color of the renovation area to match the glazing color of the existing building
2. Carefully review plans, elevations, details and schedules.

1.3 Samples

1. Upon request, provide samples of all products and materials included in this Section.

1.4 Environmental Requirements

1. Install compound, sealants or tapes only when glazing surfaces are at temperatures over 4°C and when no moisture is accumulating on them from rain, mist or condensation..

PART 2 PRODUCTS

2.1 Materials

1. General:
 - 1.1. Materials shall be new, clean and of best quality.
 - 1.2. Install in accordance with manufacturer's recommendations.
 - 1.3. Glass to be thicknesses indicated and transparent unless otherwise noted.
2. Polished Plate or Float Glass: To CAN/CGSB-12.3-M76, AMDT.Jan80, glazing quality.
3. Laminated Glass: To CAN/CGSB-12.1-M90 c/w 0.060 pub layer 7mm thick.
4. Glazing Tape: A polyisobutylene - Butyl, preformed sealant equal to Tremco 440 or Tremco Polyshim.
5. Glazing Gaskets: To be continuous extruded neoprene or EPDM design.
6. Sealants:
 - 6.1. One-part high modulus silicone equal to 999 by Dow.
 - 6.2. One-part polyurethane equal to Dymonic by Tremco.

PART 3 EXECUTION

3.1 General

1. Install materials in accordance with manufacturer's specifications and ensure that each material in a glazing system is compatible with the other.

2. Before commencing glazing, carefully review the existing condition to ensure that it is satisfactory to receive the Work of this section. Failure to report an unsatisfactory or questionable condition will leave this Contractor responsible for the possible removal and reinstallation or replacement of his.

3.2 Installation

1. Exterior Glazing:
 - 1.1. Size glass units to accurately fit openings with a 1/8" (3mm) edge clearance.
 - 1.2. Solvent clean contact surfaces, apply primer sealer.
 - 1.3. Apply glazing tape to face of stop.
 - 1.4. Install glass on setting blocks to centre in opening and maintain clearance; ensure full contact and adhesion with tape at perimeter.
 - 1.5. Use butyl tape, reinforced butyl tape or spacer blocks to maintain glass in centre of rebate in accordance with glazing systems manufacturer's specifications.
 - 1.6. Apply continuous heel bead (air seal); one-part polyurethane.
 - 1.7. Apply cap bead at exterior perimeter of glass; one-part silicone.
 - 1.8. Cap beads to be sloped to shed water away from face of glass.
 - 1.9. Install materials to ensure vent holes in frame remain clear.
2. Interior Glazing:
 - 1.1 Self-adhesive tape and sealant installation (with glazing stops on each side of the glass):
 - a) Cut self-adhesive glazing tape to suitable length and install against glazing panel so that the glazing tape is recessed 3 mm below the face of the glazing stops. Seal corners by butting tape and sealing junctions with sealant.
 - b) Place setting blocks at ¼ points of glazing panel, with edge blocks at maximum 150 mm from panel corners.
 - c) Rest glazing panel on setting blocks and push against fixed glazing stops, exerting sufficient pressure to obtain full contact between surfaces.
 - d) Install removable stops without displacing the self-adhesive glazing tape on the glazing panel, exerting sufficient pressure on tape to obtain full contact between surfaces.
 - e) Trim protruding tape edge.
 - f) Fill the gaps between the glazing and the glazing stops with sealant flush with the sight line, and use appropriate tool to obtain straight, smooth bead.
 - 1.2 Self-adhesive tape and structural sealant installation (with glazing stop on only one side of the glass):
 - a) Cut self-adhesive glazing tape to suitable length and install against glazing panel so that glazing tape is recessed at least 8 mm below the face of the glazing stops. Seal corners by butting tape and covering junctions with sealant.

- b) Place setting blocks at $\frac{1}{4}$ points of glazing panel, with edge blocks at maximum 150 mm from panel corners. Recess these blocks slightly to permit application of sealant flush with exposed side.
- c) Rest glazing panel on setting blocks and push against fixed glazing stops to obtain full contact between surfaces.
- d) Lay out spacer shims to obtain joints of equal width on both sides of the glazing panel. Recess shims slightly to permit application of sealant flush with exposed side.
- e) Trim protruding tape edge.
- f) On the side with the glazing stops, fill the gaps between the glazing and the glazing stops with structural sealant flush with the sight line, and tool or wipe sealant surface smooth.
- g) On exposed side, fill joints between glazing and frames and joints between two glazing panels with structural sealant, flush with the sight line, and use appropriate tool to obtain straight, smooth bead.
- h) Provide temporary supports for panels until sealant is fully cured. Do not remove supports until sealant manufacturer has provided written authorization to do so.

1.3 Structural sealant installation (application without glazing stops):

- a) Place setting blocks at $\frac{1}{4}$ points of glazing panel, with edge blocks at maximum 150 mm from panel corners. Recess these blocks slightly to permit application of sealant flush with exposed side.
- b) Rest glazing panel on setting blocks and press against temporary support to obtain stable, vertical installation.
- c) Lay out spacer shims to obtain joints of equal width on both sides of the glazing panel. Recess shims slightly to permit application of sealant flush with exposed side.
- d) Fill joints between glazing and frames and joints between two glazing panels with structural sealant, flush with the sight line, and use appropriate tool to obtain straight, smooth bead.
- e) Provide temporary supports for panels until sealant is fully cured. Do not remove supports until sealant manufacturer has provided written authorization to do so

3.3 Cleaning

1. Remove all glazing materials from finished surfaces.
2. Remove labels after work is complete.
3. Clean glazing panels.

END OF SECTION

PART 1 GENERAL

1. Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Painting of interior paintable surfaces.

1.2 References

1. Aluminum Association:
 1. Designation for Aluminum Finishes
2. American Society for Testing and Materials International (ASTM):
 1. ASTM C475/C475M, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
 2. ASTM C514, Specification for Nails for the Application of Gypsum Board ASTM C557, Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing
 3. ASTM C645 Standard Specification for Nonstructural Framing Members
 4. ASTM C840, Specification for Application and Finishing of Gypsum Board
 5. ASTM C954, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
 6. ASTM C1002, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 7. ASTM C1047, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
 8. ASTM C1396/C1396M, Standard Specification for Gypsum Board
 9. ASTM C1629/C1629M, Standard Classification for Abuse Non-decorated Interior Gypsum Panel Products & Fiber Reinforced Cement Panels
 10. ASTM D3273, Standard test Method for Resistance to Growth of Mold on the Surface on Interior Coatings in an Environmental Chamber
3. Canadian General Standards Board (CGSB):
 1. CAN/CGSB-51.34- Vapour Barrier, Polyethylene Sheet for Use in Building Construction
 2. CAN/CGSB-71.25- Adhesive, for Bonding Drywall to Wood Framing and Metal Studs
4. Canadian Standards Association:
 1. CSA S136 – North American Specification for the Design of Cold-Formed Steel Structural Members
5. Green Seal Environmental Standards (GS):
 1. GS-11, Paints and Coatings
6. Gypsum Association:
 - .1 GA-216, Application and Finishing of Gypsum Panel Products
 - .2 GA-214, Recommended Levels of Gypsum board Finish
7. International Organization for Standardization:
 1. ISO 14024– Environmental Labels and Declaration, Type I Environmental Labeling Principles and Procedures

2. ISO 14025 – Environmental Labels and Declarations, Type III Environmental Declarations Principles and Procedures
8. Underwriters' Laboratories of Canada (ULC):
 1. CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials
 2. CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies

1.3 Delivery, Storage and Handling

1. Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
2. Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
3. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged

1.4 Site Environmental Requirements

1. Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
2. Apply board and joint treatment to dry, frost free surfaces.
3. Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application

1.4 Submittals

1. Submit required submittals in accordance with Section 01 33 00.
2. Product data sheet

1.5 Waste Management and Disposal

1. Separate and recycle waste materials in accordance with Section [01 74 21 - Construction/Demolition Waste Management and Disposal].
2. Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate on-site] for recycling in accordance with Waste Management Plan.
3. Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard

PART 2 PRODUCTS

2.1 General

1. All products used for work in this section, particularly boards, tape, joint cement and other similar products, shall be sourced from a single manufacturer to the extent possible

2.2 Boards

1. Standard boards:
 1. Boards conforming to ASTM C1396, consisting of synthetic plaster, with the web made from 98% anhydrous calcium sulphate, covered on each side with paper made from 2% recycled content, of ordinary type and of X type where required, of the thickness specified in the drawings & documents, 1220 mm wide and of the maximum working length, with squared edges on the ends and rounded and bevelled edges on the sides, and consisting of at least 0.75% post-consumer recycled materials and at least 94% pre-consumer (postindustrial) recycled materials. The boards shall be locally sourced.
2. Support boards and boards forming the core of shaft walls:
 1. Boards conforming to ASTM C1396, of the required type and thickness to meet the approved fire resistance specified in the documents, made from at least 3.9% post-consumer recycled material and at least 93.5% pre-consumer (post-industrial) recycled material.

2.3 Furring and Channels

1. C-shaped supporting suspension channels, hanger rods, mounting screws, add-on parts and anchors: conforming to ASTM C645, galvanized. For elements comprising interior & exterior wall and soffit components, channels coated with a layer of zinc measuring at least 275 g/m² (Z275 designation) in accordance with ASTM A653M.
2. Furring channels for drywall: made from galvanized steel, with a basic steel web not less than 0.836 mm thick in accordance with CSSBI SSF 10 – Table 5, allowing for gypsum boards to be screwed in. For elements comprising interior & exterior walls, parapets and soffits, channels coated with a layer of zinc measuring at least 275 g/m² (Z275 designation) in accordance with ASTM A653M.
3. Flexible furring for drywall (resilient channels): made from galvanized steel, with a 0.5 mm thick web, allowing for flexible attachment of gypsum boards.
4. Other furring and channels:
 1. Sub-girts: Z-shaped continuous steel bars (made from one or more mechanically joined parts as indicated), hot-dip galvanized according to designation Z275 in accordance with ASTM A653M, minimum 18 gauge (1.26 mm)..

2.4 Accessories

1. Sound-absorbing wool (also referred to as "acoustic insulation material" in the documents).
 1. Fireproof acoustic insulation to be inserted between the studs, also identified as IS01 in the documents:
 1. Mineral wool with a 48 kg/m³ density for a 38 mm thickness, and a 40 kg/m³ density for a 50 mm thickness and above, of the required thickness to fill the cavity or as specified in the drawings.
2. Fasteners for acoustic insulation: through-type fasteners, made from perforated cold-rolled carbon steel, 0.8 mm thick, measuring 50 x 50 mm and adhesive-coated on the back, annealed

steel rod 2.5 mm in diameter and of appropriate length for the insulation thickness, self-locking washers 25 mm in diameter

3. Hangers: soft annealed and galvanized steel wire, 1200 mm o.c. maximum
 1. Diameter: 3.6 mm for access tile ceilings
 2. Diameter: 2.6 mm for other ceilings
4. Screws for use in interior elements: conforming to ASTM C1002 and ASTM C954 for fastening panels to heavyduty support assemblies (0.84 mm and higher), of a length and size appropriate to the work.
5. Fasteners for securing furring and hanger rods to concrete blocks or poured concrete: penetrating fasteners of a type suitable for the work, of appropriate length.
6. Zinc finishing moldings for control joints, of a thickness suitable for the conditions, with 6 mm x 11 mm openings protected by plastic tape.
7. Finishing moldings, not specifically identified in the drawings: made from zinc-coated metal conforming to ASTM C1047, paper-laminated; one length per location, of a model appropriate for the conditions indicated in the documents, particularly for the following conditions:
 1. end moldings:
 2. moldings for control joints: ½" x ½"
 3. moldings for U-shaped reveals: aluminium
 4. corner reinforcements
 5. zinc moldings for control joints
8. Prefinished sheet metal: aluminium and/or steel, anodized and/or prepainted, gauge as specified, in a colour of the Client Representative's choosing, using maximum length.
9. Insulating strips between gypsum boards and exterior wall, window and door frames: Made from precast, low-density, closed-cell neoprene, self-adhesive on one side, Shore A 40 to 50 Durometer hardness in accordance with ASTM D1056, 13 mm wide and 3 mm thick, black in colour.
10. Felt strips to adhere to studs or furring, 3 mm thick, of a width appropriate to the width of the support studs.
11. Joint tape:
 1. Gypsum boards: joint tape specifically intended for taping gypsum board
 2. Joints for which a setting-type compound is prescribed: fiberglass tape
12. Coating for joints: conforming to standard ASTM C475, asbestos-free, non-lightweight.
 1. Use a setting-type joint compound for the first coat of all gypsum board joints installed in damp locations, particularly washrooms, shower rooms and locker rooms. Use this compound with fiberglass tape.
 2. For other joints, and for subsequent coats on gypsum boards in damp locations, use a premixed nonlight weight compound.

13. Skim coat for gypsum board (no. 5 grade finish): vinyl-acrylic latex-based, producing a durable quality finish that can be painted after drying overnight or left unpainted for ceiling applications with a matte white finish.
14. Laminating adhesive: as per manufacturer's recommendations, asbestos-free.
15. Access panels: as specified in the Electrical and Mechanical documents and in Section 08 31 00.01 – Access Doors and Panels for Mechanical Systems and Installations.
16. Firestopping and smoke seal systems: as specified in Section 07 84 00 – Fire Stopping.
17. Sealants and sealing products: as specified in Section 07 90 00 – Joint Sealants.

PART 3 EXECUTION

3.1 Inspection

1. Prior to installing the top boards, inspect the framing to ensure that the mounting screws which temporarily secure the studs to the top wall plates have been removed

3.2 Mounting - General

1. Unless otherwise specified and except where stricter requirements are stated in the documents, install and finish the gypsum boards in accordance with ASTM C840 and the recommendations in the most recent edition of the CGC Gypsum Construction Handbook.
2. Unless otherwise specified and except where stricter requirements are stated in the documents, install the wall furring meant to accommodate the gypsum boards in accordance with ASTM C840.
3. Unless otherwise specified and except where stricter requirements are stated in the documents, secure the hanger rods and support suspension channels for gypsum board suspended ceilings in accordance with ASTM C840.
4. Install the elements level and plumb, with a permissible deviation of 1:1200.

3.3 Mounting of Furring

1. Unless otherwise specified and except where stricter requirements are stated in the documents, install the support suspension channels using hanger rods, at 1200 mm o.c. maximum.
2. Unless otherwise specified and except where stricter requirements are stated in the documents, install the furring perpendicular to the support suspension channels or between gypsum board thicknesses, as specified, not more than 610 mm o.c. and not more than 150 mm from the ceiling/wall edge. Screw them into each support with drywall screws of appropriate length. Also install furring all along the wall plate at the top of the metal framed partitions.
3. Secure the light fixtures using additional hanger rods placed not more than 150 mm from the corners of the fixtures and not more than 600 mm all around.
4. Install furring channels around openings accommodating access panels, grids and other openings

3.4 Board Installation

1. Install gypsum board after frames, anchors, blocks, insulation, and electrical and mechanical work have been approved.
2. Secure the boards to the furring or metal framing using screw anchors for the first layer and screws for the second layer; use laminating adhesive and screws where prescribed by fire-resistant system testing reports and where indicated.
3. Unless otherwise specified and except where stricter requirements are stated in the documents, particularly details contained in fire-resistant system testing reports, screw in the screws at the same spacing as that specified between the studs.
4. Where more than one thickness of board is required, stagger the joints at least 300 mm from one layer to the other.
5. Place a continuous bead of acoustic sealant 12 mm in diameter around the edges of each partition up to the junction of the gypsum boards and frame, where the partitions abut fixed elements of the structure. Perfectly seal all cut-outs around electrical boxes and conduits in the acoustic assemblies.
6. Unless otherwise specified, install the gypsum boards vertically. Where the height of the walls or partitions requires more than one gypsum board, install them staggered vertically to avoid continuous horizontal joints. .
7. In partitions where the gypsum boards are attached to a plywood base, alternate the joints with those of the wood bases.
8. At the top of the partitions, leave an empty space between the gypsum boards and the structure. Do not attach the gypsum boards to the top plate; ensure that the distance between the top screws screwed into the studs and the bottom of the top plate or telescopic head is the same as for the gypsum boards.
9. Install multiple layers of thin gypsum board for curved structures, as specified in the drawings and as recommended by the manufacturer.
10. Install 25 mm support boards where indicated by inserting them into the grooves for that purpose, integrated into the shaft wall studs.
11. Unless otherwise specified, install the surface moldings where the gypsum boards meet the surfaces without a joint cover, and where indicated

3.5 Fire Resistant Systems

1. Install fire-rated systems where indicated and as specified to attain at least the degrees shown on the drawings.
 1. Where references to approved systems are made, build the structures taking account of all the details contained in these testing reports. However, the drawings may contain more restrictive requirements than these testing reports, particularly in the case of acoustic assemblies; build these structures in line with all the requirements for compliance with both the fire resistance rating indicated and any other criteria, as specified.

2. If the drawings indicate assemblies with a fire resistance rating where no reference is made to approved systems, build the structures taking account of all the details contained in the testing reports on similar assemblies. However, the drawings may contain more restrictive requirements than these testing reports, particularly in the case of acoustic assemblies; build these structures in line with all the requirements for compliance with both the fire resistance rating indicated and any other criteria, as specified.
2. Follow the requirements set out in building codes and in CAN/ULC-S112 regarding openings in a fire separation.

3.6 Installation of Accessories

1. Mount accessories squared, plumb or level, and secure them firmly in the proper plane.
2. Use full-length pieces where possible.
3. Make joints tight, aligned and firmly secured.
4. Mitre and fit corners accurately, free from any rough edges.
5. Secure the elements at 150 mm o.c.
6. Install the friction-fit acoustic wool between the studs, in maximum lengths, where required. Use through-type fasteners to ensure that the insulation in the assemblies remains in place for the long term. Use at least three anchors per 1200 mm board.
7. Install prefinished sheet steel strips in the open joints, where indicated, keeping the number of sheet joints to a minimum.
8. Install continuous insulation strips between the frames of the exterior curtain walls, doors and windows and interior partitions, in places where these partitions abut frames, by adhering them to the frame, such that the strips are recessed not less than 3 mm from the face of the gypsum board. Do not fasten boards or furring to the frames of exterior curtain walls, doors and windows without the specific written consent of the manufacturer of these materials.
9. Install all other indicated or specified accessories according to directions and written instructions from the manufacturer concerned.

3.7 Contraction and Expansion Joints

1. Make contraction joints from pre-formed elements embedded in the gypsum board finish, and secured independently on each side of the joint.
2. Make the contraction and expansion joints where specified in the drawings and where there are construction and expansion joints, abutments of the structural elements, slabs on each floor, places where the type of support changes and contraction joints in block walls, in line with the door jambs up to the ceiling, about every 9 m along long hallways and not more than every 9 m in both directions in the ceilings.
3. Apply a continuous polyethylene strip (forming an anti-dust screen) on the back of the contraction and expansion joints, overlapping them.
4. Square and align the contraction and expansion joints

3.8 Treatment of Joints

1. Plasterboard finish: finish plasterboard walls and ceilings in accordance with the AWCI document GA-214, Recommended Levels of Gypsum Board Finish.
2. Do not, under any circumstances, finish the joints of tile backers and/or cement boards requiring a ceramic tile covering.
3. Finish the joints between the gypsum boards and in the inside corners using the following products: joint compound, joint tape and taping compound. Unless otherwise specified and except where stricter requirements are stated, particularly the details contained in fire-resistant system testing reports, apply these products according to the finish level (grade) described below, as per the manufacturer's recommendations, and smoothen by featheredging the board surface.
4. Finish level:
 1. Level 0: For gypsum board surfaces in temporary construction or if final decoration is undetermined.
 - 1) No jointing product, accessory or finishing element required.
 2. Level 1: For gypsum board surfaces in ceiling spaces and other areas which are completely concealed from view.
 - 1) Install with joints and inside corners covered with tape embedded in the joint compound. Jointed surfaces shall be free of excess joint compound, but tool marks and ridges are acceptable.
 3. Level 2: For gypsum board surfaces in places not accessible to the public or building personnel.
 - 1) Embed the tape installed on the joints and inside corners into a joint compound and apply a separate layer of compound on the joints, corners and head of the fasteners and other accessories used. Jointed surfaces shall be free of excess joint compound, but tool marks and ridges are acceptable.
5. For acoustic assemblies and assemblies with more than one board thickness with recessed decorative molding, finish all the joints of the board thickness immediately behind that which has the decorative moldings to ensure the acoustic integrity of the assembly.
6. Once installation is complete, the structure shall be smooth, free of ripples and other defects, and ready to be coated with a finishing coat.

3.9 Finishing of Perimeter of Frames

1. Apply a thin bead of sealant around the entire perimeter of the frames up to where the frame meets the gypsum, plaster or concrete surfaces, in accordance with Section 07 92 00 – Joint Sealants.
2. Coordinate execution of this work with that outlined in Section 09 91 99 – Painting – Minor Works, when the sealant needs to be painted

3.10 Mechanical or Electrical Equipment Shown on the Ceiling Drawings

1. The drawings showing the ceiling plans and wall elevations do not show all the equipment, particularly all the access panels and all mechanical and electrical components integrated into these structures. Consult the mechanical/electrical drawings for the approximate location and quantity of equipment. The exact location of this equipment shall be consistent with the

architectural drawings; if the architectural drawings do not include these specifications, or if there is a discrepancy between the architectural drawings and the mechanical/electrical drawings, obtain clarification from the Client Representative regarding the exact position of the equipment. If these equipment are existing on site & to remain on site, then work to be executed based on maintaining these existing equipment.

END OF SECTION

PART 1 GENERAL

1.1 Related Scope

1. Build interior ceiling bulkheads so that they can withstand uniform pressure of 0.25 kPa applied alternately to each board face, such that the deflection does not exceed 1/240 of the span. Increase the gauge of the metal framing as required.
 - 1) Upon request, submit the framing manufacturer's calculations, establishing compliance with this requirement.
2. Supply and install any bracing, reinforcements, accessories and clearances required to meet the earthquake requirements set out in the National Building Code 2015

1.2 Shop Drawings

1. Submit shop drawings in accordance with the General Conditions and Divisions 00 and 01.
2. submit drawings of metal frames located above glass doors and partitions, indicating the bracing and reinforcements required to withstand lateral loads imposed on these structures.
3. Have all these drawings and calculations sealed and signed by a professional engineer with the appropriate framing qualifications who is a member in good standing of Ontario Professional Engineers in order for the structural designs to comply with these requirements.

1.3 Product Data

1. Submit required product data in accordance with the General Conditions and Divisions 00 and 01.
2. Submit product data for the specified products, including one copy that shall remain permanently on site. Product data must include the following information:
 1. Description of products and their performance;
 2. Installation recommendations; and
 3. Ambient conditions.

1.4 Acceptable Material or Products

1. Where materials or products are prescribed by their brand name, consult the Instructions to Tenderers for the procedure to be followed for seeking approval of alternative materials or products

1.5 Definition

1. For the purpose of this section, the term "acoustic assembly" means any concrete block wall or partition, any continuous slab-to-slab wall or partition, any gypsum wall containing acoustic

insulation, as well as any horizontal acoustic membrane (ceiling) made of two or more thicknesses of gypsum

PART 2 PRODUCTS

2.1 Material

1. Framing for dropped ceilings:
 1. Non-structural framing consisting of C-channel studs: Compliant with ASTM standard C645; studs of the depth shown on the drawings, made from hot-dipped galvanized rolled steel sheet (Z180 designation), consisting of at least 69% post-consumer recycled materials and at least 19.5% pre-consumer recycled materials, of the thickness shown on the drawings or required based on the manufacturer's calculations to ensure the resistance and rigidity specified in the calculation criteria, the strictest criterion prevailing, but not less than 1.087 mm of the minimum thickness of the base steel in accordance with CSSBI SSF 10 – Table 5; the studs shall be designed such that gypsum boards can be screwed into them, and shall have half-perforated openings for ducting spaced not more than 610 mm o.c.
 2. Top and bottom plates: compliant with ASTM standard C645, consisting of at least 69% post-consumer recycled materials and at least 19.5% pre-consumer recycled materials, made from hot-dip galvanized rolled steel sheet (Z180 designation), of a minimum thickness of 1.087 mm, of a width appropriate to the stud dimensions, with 50 mm high flanges for the bottom and 50 mm high flanges for the top.
2. Accessories:
 1. Screws: sheet metal screws, with the appropriate head, either self-tapping or self-drilling depending on the application, of a length appropriate to the thickness of the sheet.
 2. Anchoring, screwing and nailing bases:
 1. Install sheet anchoring, screwing and nailing bases, only if installation of plywood anchoring, screwing and nailing bases is impossible.
 2. Use plate pieces with the same zinc coating and of the same thickness as those of the stud into which they are to be installed, but not less than 0.836 mm (before zinc coating), of a width appropriate to the application, cut as needed. Increase the thickness of the plate or sheet pieces for the requested equipment to which they will be affixed, such as handrails, disabled grab rails or other similar equipment.
 3. Flexible clips: made from 1.8 mm galvanized steel (before zinc coating), of a depth appropriate to the stud, with an angled profile to laterally support the studs at the top without preventing vertical movement. .1 Acceptable product: Fast Top™ Clip from Clark Dietrich Building Systems, or alternative product approved by addendum in accordance with Instructions to Tenderers
 4. Insulating strip: waterproof, self-adhesive (on one side) foam rubber strip, 3 mm thick, 12 mm wide, of the required length.
3. Firestop & smoke seal system: : in conformity with the requirements set out in Section 07 8400 – Fire Stopping.
4. Sealants and sealing products: in conformity with the requirements set out in Section 07 90 00 – Joint Sealants

PART 3 EXECUTION

3.1 Mounting

1. Follow the directions in the drawings for the dimensions of the dropped ceilings.
2. Place the plates on the floor and ceiling, aligning them with precision, and secure them not more than 400 mm o.c.
3. Use toggle fasteners for plates parallel to underlying furring.
4. Install the studs vertically at the distances shown on the drawings and not more than 50 mm from the point where the walls meet, and on each side of the openings and corners. Secure the studs to the top and bottom plates. Brace the studs such that the framing is rigid as per the manufacturer's instructions.
5. The maximum permissible deviation for mounting is 1:1000.
6. Screw the studs into the bottom plates and use crimping for the top plates, except where steel stud framing is subjected to wind loads.
7. In general, leave space to accommodate deflections between the studs and the top plate, Leave some clearance under the beams and supporting slabs so that structural loads are not transferred to the studs. Install top plates with 50 mm or higher flanges, suitable for the conditions. Do not secure the top plates to the gypsum boards and channels.
8. Where the top plates are secured to ceiling suspension channels, use only clips intended for that purpose. Do not pierce or damage the suspension channels. Brace the partitions secured to the suspension channels independently of the bracing required for the ceilings. The spacing of this bracing shall be compatible with the horizontal deflection at the partition head and that of the ceilings, but shall not exceed 1800 mm o.c.
9. Coordinate the placement of the studs with the installation of ducting for various services. Place the studs so that the openings are properly aligned.
10. Coordinate the placement of the studs with that of the door and window frames and other supports or anchors intended for the structures specified in other sections.
11. Pair studs (over the entire height of the room) on each side of the openings whose width is greater than the centre-to-centre distance specified for the studs, using 20 gauge studs at a minimum. On the head of these paired studs, install flexible clips to stabilize the studs laterally.
12. Furr openings and around built-in equipment, cabinets and access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
13. Install steel studs or furring channels between the main studs such that junction boxes can be mounted for electrical or other installations.
14. Install continuous insulating strips of the same width as the studs to insulate the studs and plates in contact with uninsulated surfaces. Do not install studs or plates in exterior curtain wall, door and window frames, unless specifically permitted in writing by the manufacturer of these materials.
15. Lay two continuous bands of insulating strips or beads of acoustic sealant underneath the studs and plates all around the edge of the acoustic assemblies.

16. Install horizontal shores and girths in tall partitions according to the manufacturer's recommendations. Use "U" channels one-third of the height and connect them to the backup walls with horizontal metal studs at 1200 mm o.c.
17. Perform all soundproofing work on acoustic assemblies: openings in these partitions, various acoustic seals relating to stud work, as instructed.
18. Perform all metal stud structure firestop and smoke seal assembly work in accordance with Section 07 84 00 – Fire Stopping and with the drawings.
19. Perform all metal stud structure sealing work in accordance with Section 07 92 00 – Joint Sealants and with the drawings.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 092216 Non Structural Metal Framing

1.2 Shop Drawings

1. Submit shop drawings in accordance with the General Conditions and Divisions 00 and 01.
2. For specific grid element layouts, submit reflected ceiling plans, as specified.
3. Shop drawings shall clearly show the layout, details on spacing and the method for attaching anchoring and suspension elements, the method for suspending sound-absorbing elements, the method for fitting together main and secondary channels, the placement of removable channels, details on elevation changes, the dimensions and placement of hatches, and the method for suspending sound-absorbing elements near ceiling fixtures, lateral support elements and accessories.
4. Arrange equipment, fixtures and outlets as laid out in the plans and in accordance with the rules of symmetry and alignment.

1.3 Product Data

1. Submit required product data in accordance with the General Conditions and Divisions 00 and 01.
2. Submit product data for the specified products, including one copy that shall remain permanently on site. Product data must include the following information:
 1. Description of products and their performance;
 2. Installation recommendations; and
 3. Ambient conditions.

1.4 Samples

1. Submit samples in accordance with the General Conditions and Divisions 00 and 01.
2. Submit a representative model of each type of ceiling.
3. Each sample shall show the mounting and assembly details, the wall connections, the built-in equipment, the splice plates, the fitting method, the finish, and the method for installing sound-absorbing elements

1.5 Mockups

1. Produce mock-ups in accordance with the General Conditions and Divisions 00 and 01.
2. Build a mock-up of each type of ceiling measuring at least 10 m² , including an inside and outside corner.
3. Build the mock-up where indicated by the Client Representative.
4. Wait 24 hours before commencing work in order to give the Client Representative time to examine the mock-up. .5 The accepted mock-up will be the minimum standard against which the structure is to be built. The mock-up may be used in the finished work.

1. Ambient Conditions

1. Do not commence installation of the ceiling elements until the building closures have been put in place and dust-generating work has been finished or well-contained.
2. Allow the surfaces to dry prior to installation.
3. Before, during and after installation, maintain a uniform temperature of at least 15°C and relative humidity of between 20 and 40%.
4. Store materials on the premises where they will be installed for 48 hours prior to use

PART 2 PRODUCTS

2.1 Material

1. Gypsum Board ceilings:
 1. Framing:

Framing for heavy loads: conforming to ASTM standard C635
2. Perimeter Ceiling Trim: to be installed around the entire perimeter of the ceiling tile where they meet walls or dropped ceilings:
 1. Shadow moulding for walls, 24 mm (15/16"), pre-painted aluminum, white finish, profiles for selection to be submitted by the contractor for review & approval.
3. Hangers: soft annealed and galvanized steel wire, conforming to ASTM standard A641, 1200 mm o.c. maximum.
 1. Diameter: 3.6 mm (9 ga.) for access tile ceilings
 2. .2 Diameter: 2.6 mm (12 ga.) for other ceilings.
4. Hangers Anchors
5. Fasteners to attach hangers to steel: mechanically-attached sheet-steel angles, of appropriate length, minimum tensile strength of 1.1 kN
6. Accessories: splice plates, fasteners, wire ties, wall/ceiling joint moldings and clips, surface/recessed, in addition to the suspension framing elements recommended by the framing manufacturer.
 1. Include cross tee adapters required to secure the suspension tees to be cut to size on site, particularly those near light fixtures with imperial dimensions.
 2. Also include transition clips for drywall in order to attach the partitions to the ceiling without damage to the suspension tees.

PART 3 EXECUTION

3.1 Examination

1. Ceiling tiles and other panels shall not be installed until the Client Representative has examined the installations that will be hidden by the ceiling

3.2 Work Coordination

1. Coordinate the mounting of elements with those sections for metal coverings and supports, light fixtures, diffusers, speakers, sprinkler heads and other elements to be mounted in the ceiling tiles

3.3 Mounting

1. Unless otherwise stated, install the framing elements in compliance with standard ASTM C636 and ASTM E580.
2. Install suspension frames as per the manufacturer's instructions and in accordance with the calculation criteria established by certification bodies.
3. Do not mount the ceiling grid until the Client Representative has examined the installations that will be hidden in the ceiling space.
4. Attach the hangers to the top frame using fastening methods checked by the Engineer.
5. Attach the hangers to the central height of the main tees, then do at least three full turns at a height of 75 mm.
6. Place the hangers at not more than 1200 mm o.c. and not less than 200 mm from the ends of the main tees.
7. Mark two perpendicular centrelines on the ceiling to ensure that the installation is symmetrical with the edges of the room. Arrange the framing such that the width of the boundary elements is not less than 50% of the standard width of the elements, or as shown in the reflected ceiling plan.
8. Properly coordinate the arrangement of the framing elements with the location of the other elements mounted in the ceiling.
9. Install wall/ceiling joint moldings that will be defining the exact height of the ceiling.
10. Once complete, the framing shall support all additional loads, particularly those of the light fixtures, diffusers, grids and so on.
11. For light fixtures and diffusers, include additional hangers installed not more than 150 mm from each corner, and not more than 600 mm apart all around the fixture.
12. Attach the transverse channels to the support channels for a rigid, foolproof assembly.
13. Install a border around openings to fit light fixtures, diffusers, speakers, and other equipment and accessories, and to accommodate ceiling level changes.
14. Install any reinforcements or anchoring, screwing or nailing bases required to accommodate accessories attached to the ceilings, as specified on the drawings and in sections 05 50 00 – Metal Fabrications, 06 10 00 – Rough Carpentry and 09 22 16 – Non-structural Metal Framing.
15. The edges of the finished ceiling shall be square along the walls and shall not have a flatness deviation greater than 1:1000.
16. Expansion joints:
 1. Unless otherwise specified, supply Z-shaped metal moldings and install them on each side of the expansion joint. Cut them to allow for more or less 25 mm clearance and to ensure joint occlusion. Finish the metal elements so that they are identical to the adjacent metal moldings. Install a support plate behind butt joints.

3.4 Installation of Ceiling Elements on Framing

1. Install the ceiling tiles and other panels on the suspension framing, as per the approved shop drawings and as recommended by the manufacturer.

2. Place flameproof acoustic insulation on the acoustic tiles where indicated so that there is a continuous layer of the specified thickness and length; carefully cut the insulation around mechanical and electrical fixtures for a precise and tight fit.

3.5 Mechanical & Electrical Components

1. The drawings showing the ceiling plans do not show all the mechanical and electrical elements integrated into the ceilings. Consult the mechanical/electrical drawings for the approximate location and quantity of equipment. The exact location of this equipment shall be consistent with the architectural drawings; if the architectural drawings do not include these specifications, or if there is a discrepancy between the architectural drawings and the mechanical/electrical drawings, obtain clarification from the Client Representative regarding the exact position of the equipment

3.6 Protection

1. Cover elements with polyethylene or cardboard to protect them from any damage.
2. Leave the protective materials in place until there is no more risk of damage

3.7 Damaged Elements

1. Prior to acceptance of the work, replace any damaged panels, and clean any soiled or dirty panels.
2. Retouch surfaces that have scrapes, scratches or other defects

3.8 Clean up

1. Take the necessary steps to ensure that the panels and all their component parts remain clean. Immediately remove any stains or smudges. Clean the surfaces according to the manufacturer's written instructions

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 00 001 General Conditions

1.2 Shop Drawings

1. Submit shop drawings in accordance with the General Conditions and Divisions 00 and 01.
2. Submit shop drawings of particular patterns, indicating the position of the joints and details, as appropriate

1.3 Product Data

1. Submit required product data in accordance with the General Conditions and Divisions 00 and 01.
2. Submit product data for the specified products, including one copy that shall remain permanently on site. Product data must include the following information:
 1. Description of products and their performance;
 2. Installation recommendations; and
 3. Ambient conditions.

1.4 Samples

1. Submit samples in accordance with the General Conditions and Divisions 00 and 01.
2. Provide two samples of tile/stripe flooring with the specified dimensions, measuring 300 x 300 mm, and baseboards 300 mm long, in each colour and pattern specified

1.5 Mockups

1. Produce mock-ups in accordance with the General Conditions and Divisions 00 and 01.
2. Build a mock-up not less than 10 m² of each type of resilient flooring, with an inside corner and an outside corner, baseboards and a welded joint, if necessary.
3. Build the mock-up where indicated by the Client Representative.
4. Wait 24 hours before commencing work in order to give the Client Representative time to examine the mock-up.
5. The accepted mock-up will be the minimum standard against which to build the structure. The mock-up may be used in the finished work

1.6 Maintenance Records

1. Provide the necessary maintenance instructions for the vinyl flooring and include them in the manual referred to in the General Conditions and Divisions 00 and 01.

1.7 Additional Material

1. Supply the necessary additional vinyl flooring tiles, resilient flooring sheets, baseboards, rope molding and adhesive as specified in the General Conditions and Divisions 00 and 01.

2. Supply an additional 2% of the total quantity of tile and sheet flooring and accessories to be supplied under this contract, in each colour and pattern, and of each type required to maintain the flooring in good condition, in addition to the adhesive required to install them
3. The extra material shall be supplied as one piece and sourced from the same product batch as the installed material.
4. Clearly identify each box of tiles, each sheet roll and each package of adhesive when used.
5. Deliver them to the job site upon completion of the work covered in this section.
6. Store everything where indicated by the Client Representative.

1.8 Ambient Conditions

1. Maintain the ambient air and the substrate surface at a temperature above 20°C for 48 hours prior to installation, throughout installation and for 48 hours afterwards.
2. Ensure that the moisture and pH levels of the concrete surfaces to be covered are within the limits prescribed by the flooring manufacturer by conducting tests in compliance with standards ASTM F-1869 and ASTM F710. Ensure that the General contractor/project manager is present during these tests. Submit the test results and location to them.
3. After removing the moisture testing dome in accordance with ASTM F-1869, conduct the pH test in accordance with ASTM F-710.
4. Before starting the work, submit a written document from the general contractor certifying that all ambient conditions, including moisture and pH level test results, are consistent with the installation recommendations specified by the flooring manufacturer.
5. Perform an adhesion test before proceeding.

1.9 Installer Qualifications

1. The work covered in this section shall be performed by an experienced contractor, accredited and certified by the flooring manufacturer. In addition, all work shall be performed in keeping with the manufacturer's installation recommendations

1.10 Extended Warranty

1. For the material covered in this section, the 12-month warranty period prescribed in the General Conditions is extended to sixty (60) months for materials and labour.
2. Provide a written document prepared and signed by both the general contractor and the installer, and issued in the name of the Client, guaranteeing the work against any defects in materials, workmanship and installation for the periods stipulated above. The warranty shall also stipulate that the work shall be free of any defects in installation, including loss of adhesion to the substrate (when adhesive applied) , loose installation, joint separation or any other similar defects that may affect appearance or durability.

PART 2 PRODUCTS

2.1 Material

1. Vinyl floor : engineered vinyl finished floor planks, with rigid core, that are:
 - a) 8.0 mm thickness x 12.01 in. width x 28.28 in. length; 12 mil wear layer
 - b) Maple color
 - c) Rigid core vinyl flooring, water proof flooring
 - d) Scratch Protect Surface Coating that performs ultimate in scratch and stain resistance
 - e) Water proof
 - f) Can be installed over most existing surfaces including tile, wood, concrete and vinyl
 - g) Treated to inhibits the growth of odor and stain causing mold and mildew on the attached underlayment and top surface layer of the flooring.
 - h) Product does not require adhesives for installation

PART 3 EXECUTION

3.1 Verification of Existing Conditions

1. During the tender period and prior to bid submission, thoroughly check all floor surfaces to be covered with vinyl flooring, record all surface conditions, particularly any areas requiring repair and/or levelling in order to obtain the specified flatness deviation, and include these repairs and levelling in the bid amount.
2. Using the methods recommended by the flooring manufacturer, ensure that concrete floors are dry and free of any traces of alkalinity, carbonization, dust, oil, grease, wax or felt marker marks, or any other product that may affect the flooring.
3. Identify the elements that will be used as a grounding source for the static control system

3.2 Substrate Preparation

1. Flatten any uneven areas on the substrate. Fill in depressions and seal cracks, joints, holes and other defects with substrate filler. Install subfloor levelling strips by gluing them in the places where the vinyl flooring meets thicker flooring, including carpet, or flooring that sits at a different level, in order to obtain a flush finished surface, or make a slight slope (not more than 1%) in places where the resilient flooring meets thicker flooring in order to obtain a flush finished surface.
2. Clean the floor to be covered, and apply filler with a trowel and float for a smooth, hard and flat surface. Keep foot traffic off until the filler has hardened and dried.
3. Prime the substrate as per the documentation provided by the resilient flooring manufacturer

3.3 Execution - General

1. Install the vinyl floor planks by forming joints parallel to the building lines so that the pattern is symmetrical. The width of the tiles along the outer edges shall not be less than half the width of a normal tile.
2. Install tiles in hallways in continuity with the joints in the rooms.
3. Arrange the tiles as indicated.
 1. Unless otherwise specified, arrange the tiles in an alternating striped pattern, forming a basket-type texture.
4. For adjoining rooms, ensure that the pattern continues from one into the other. In such cases, confirm the starting point of the pattern with the Client Representative.
5. Carefully cut flooring around fixed objects. Unless otherwise specifically indicated, continue the flooring under furniture, including fixed and built-in pieces.
6. Place decorative strips and reference tile where indicated. Make tight joints.
7. Extend the flooring over surfaces to be receiving removable partitions, and follow the pattern.
8. In doorways, interrupt the flooring under the transverse centreline of the door where the finish or colour of the flooring is different in adjoining rooms. Where these doors have an automatic door bottom, ensure that it rests on a smooth surface. Where applicable, continue the flooring up to the limit determined by the Client Representative.
9. Install reducers in places where flooring edges are exposed or not protected.

3.4 Installation of Vinyl Baseboard

1. Install the baseboards so as to minimize the number of joints. Use the longest available baseboards or make joints in inside or precast corners.
2. Clean the substrate and prime with a layer of adhesive.
3. Apply the glue to the back of the baseboard.
4. Firmly secure the baseboards to the wall and floor using a 3 kg manual roller.
5. Install the baseboards aligned and level, with a permissible deviation of 1:1000.
6. Cut the baseboards down to fit against door frames and other obstacles. In places where door frames are embedded, install precast end pieces.
7. In inside corners, make lap joints. Use precast corner pieces in squared outside corners. Use precast straight sections to form outside corners that are not square, and provide not less than 300 mm for each flange. In outside corners, install straight, wraparound baseboards.
8. Install straight baseboards before installing carpet on a floor.

3.5 Initial Cleaning

1. Carefully remove any excess adhesive from the baseboards and walls.
2. Where recommended by the manufacturer and/or where indicated, clean, the newly finished floor and baseboards as per the flooring manufacturer's documents, in accordance with the following minimum requirements:
 1. Remove dirt generated by the laying of tiles using a polisher of appropriate speed. Move the polisher from left to right, cleaning the tiles without using water.

2. For stubborn spots, use an appropriate cleaning solution that does not damage the tile in a manual spray. Spray a mist on the tiles to be cleaned while using the polisher.
3. After these two steps, go over the tiles with an untreated dry mop to remove any unwanted particles on the tiles.
4. Walls, doors, door frames, ceramic, concrete, etc. shall be free of sealant and floor finish

3.6 Protection

1. Protect the newly finished flooring and until final inspection.
2. Keep foot traffic off floors for 48 hours following installation of the flooring.
3. Protect all finished surfaces from any damage that may occur after completion, until provisional acceptance of the project, with 3 mm thick masonite boards, with taped joints

END OF SECTION

PART 1 GENERAL

1. Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Painting of exterior paintable surfaces.
2. Painting of interior paintable surfaces.

1.2 Paintable & Non-Paintable Surfaces

1. Paint and finish paintable surfaces included in the Work, except where excluded by the Contract Documents.
2. The following surfaces are considered non-paintable, except as otherwise indicated or scheduled:
 - a) Material and equipment furnished prime and finish painted.
 - b) Internal surfaces of steel tanks and stacks.
 - c) Sprayed fire-resistive materials.
 - d) Exterior concrete.
 - e) Stainless steel, weathering steel, copper, bronze, chromium plate, nickel, anodized or lacquered or mill finished aluminum, Monel metal.
 - f) Insulation, glass, plastic, brick, stone.
 - g) Metallic and mastic insulation finishes.
 - h) Abrasive material finishes on floors, stair treads, stair nosing and landings.
 - i) Insulated electric cables.
 - j) Machined parts of machinery and equipment.
 - k) Concealed surfaces.
 - l) Manufactured finish materials.

1.3 References & Standards

1. Except where more stringent requirements are specified, the following reference standard shall govern the work of this section:
 - a) Master Painters Institute (MPI) Architectural Painting Specification Manual (MP Manual), including Identifiers, Evaluation, Systems, Preparation and Approved Product List, latest edition, and referenced herein as the MPI Manual, as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.

1.4 Quality Assurance

1. Qualifications of applicators:
 - a) Applicators shall have minimum of 5 years proven satisfactory painting experience of projects of similar size and class subject to Consultant's approval.

- b) Only qualified journeymen who have a “Tradesman Qualification Certificate of Proficiency” shall be engaged in painting work. Apprentices shall work under the direct supervision of a qualified journeyman in accordance with trade regulations.
2. Quality standard: Materials, preparation and workmanship shall conform to requirements of latest edition of Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
3. Paint manufacturers and Products used shall be as listed under the Approved Product List section of the MPI Painting Manual.
4. Where “special” painting or coating system applications (such as non-MPI listed Products or systems) are to be used, the paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application.
 - a) Manufacturer shall provide field review in accordance with Section 01 45 00.
5. Painting Subcontractor shall obtain from Contractor written confirmation of specific surface preparation procedures and primers used for fabricated steel items from the fabricator/Supplier to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.
6. Conduct a pre-installation meeting in accordance with Section 01 31 19.
 - a) APS/MPI Inspector shall attend pre-installation meeting.
7. Paint and Coating Quality Assurance Inspections:
 - a) Field quality control shall be in accordance with Section 01 45 00.

1.4 Submittals

1. Submit required submittals in accordance with Section 01 33 00.
2. MPI Manual (Master Painter Institute) : Submit 1 copy of MPI Manual – latest edition, and maintain at site office for reference.
3. Product data and list of Products:
 - a) Submit manufacturer’s Product data sheets for Products proposed for use in the work of this section as identified in ‘Approved Product List’ section of the MPI Painting Manual. Correlate Products to Schedule furnished by Consultant.
4. Samples and colours:
 - a) Colours: Consultant will furnish paint colour numbers and colour schedule indicating colour locations.
 - b) Samples for initial selection:
 - (i) Submit manufacturer's colour charts showing full range of colours available, including light and deep dark tones, for each type of finish material indicated for colour selection by Consultant.

- (ii) Consultant shall have complete freedom in choice of colours in compiling colour schedule and will not necessarily select colours from standard colour charts of manufacturer of Products specified.
 - (iii) Colour schedule: to later selection by Consultant.
 - (iv) Submit 3 drawdowns of each selected colour for review by Consultant and resubmit to Consultant as required to obtain final approval. Drawdown to be of specified colour, sheen, and paint formula for applicable surface.
 - c) Samples for verification:
 - (i) Submit 3 samples on 200 mm x 305 mm (8"x 12") material of same type as that on which coating is to be applied, for Consultant's approval, at least 30 days before materials are required.
 - (ii) Identify each sample as to Project, finish, formula, colour name, number, gloss name and number, date and name of Contractor and painting Subcontractor.
 - (iii) Resubmit as required until colours and gloss value are approved.
- 5. Mock-ups:
 - a) Provide full finished mock-up installation of each paint colour, for indicated surfaces and mock-up size, showing colour and finish selected by Consultant, under lighting conditions matching final area lighting, for acceptance by Consultant. Locate at Place of the Work as part of finished installation if accepted.
 - (i) Concrete block, concrete and gypsum board: 9.3 m² (100 ft²).
 - (ii) Hollow metal doors and frames: 1 door and frame for each finish specified.
 - b) Upon completion and approval, sample finishes shall serve as a standard for the balance of the work of this section. Subsequent work carried out and not in the Consultant's opinion equal to standard shall be repainted without charge.
- 6. Closeout submittals:
 - a) Submit closeout submittals in accordance with Section 01 77 00.
 - b) Maintenance materials: Provide 2 sealed containers, each of 4 litres (1 gallon) capacity of each paint product in each colour used in the Work for Owner's maintenance use. Containers shall be new, clearly labelled with manufacturer's name, type of paint, colour and colour number. Store at Place of the Work where directed by Owner.

1.5 Environmental Requirements

1. Comply with environmental requirements of MPI Manual.
2. Perform no painting work when ambient air and substrate temperatures are below 10°C for both interior and exterior work, unless suitable weatherproof covering and sufficient heating and ventilation facilities are in place in accordance with MPI Manual.
3. Perform no painting work when relative humidity is above 85% or when dew point is less than 3°C (5°F) variance between air/surface temperature.

4. Check moisture content of surfaces to be painted using properly calibrated electronic moisture meter approved by APS/MPI Inspector, and Consultant, or other approved method. Maximum moisture contents shall be in accordance with manufacturer's recommendations and as follows:
 - a) Concrete and concrete masonry (clay and concrete brick/block): Maximum 12%.
 - b) Gypsum board and plaster: Maximum 12%.
 - c) Wood: Maximum 15%.
5. Conduct moisture tests on concrete floors using cover patch test method.
6. Test concrete, masonry and plaster surfaces for alkalinity.

1.6 Delivery, Storage & Handling

1. Deliver painting materials in sealed, original labelled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.
2. Store paint Products and materials in original labelled containers in secure (lockable), dry, heated and well ventilated single designated area meeting minimum requirements of both paint manufacturer and authorities having jurisdiction, and at a minimum ambient temperature of 7°C.
3. Protect floor and wall surfaces of storage area. Protect floors with sheets or clean plywood or metal pans where mixing is being carried out.

1.7 Warranty

1. Warrant work of this section for a period of 2 years.
2. Throughout warranty period, painting systems shall remain free from failure due to causes including: material failure; surface preparation less than that specified; and paint film thickness less than that specified, or when not specified, less than that coverage recommended by manufacturer.
3. Presence of any of following during the warranty period shall constitute failure: visible corrosion; film peeling, blistering, checking, scaling, embrittling or general film disintegration; and poor adhesion as determined by tape "peel-off" test procedures.

PART 2 PRODUCTS

2.1 Materials

1. Products listed in MPI Manual shall be used in the Work, unless specified otherwise.
 1. Products within each MPI paint system code: From single manufacturer. Acceptable Manufacturer:
 - A) For Interior Drywalls: Swiss Coffee 12 from Behr paint colors or equal, latex, eggshell finish.
 - B) For metal doors & door frames: Baja PPU7 - 08 ,

2. Paint and materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, and the like) shall be in accordance with the MPI Manual “Approved Product” listing and shall be from a single manufacturer for each system used.
3. Other paint materials, such as linseed oil, shellac, and the like, shall be highest quality Products of an approved manufacturer listed in the MPI Manual and shall be compatible with other coating materials as required.
4. Paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes or sags.
5. Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by building code requirements and/or authorities having jurisdiction.
6. Paints and coatings materials used within the weatherproofing system shall not exceed the VOC content limits of the following criteria.
 - a) Interior paints and coatings: to following Green Seal GS-11 VOC limits:
 - (i) Flat coating type: 50 gm/L.
 - (ii) Non-flat coating type: 100 gm/L.
 - b) Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Green Seal Standard GC-03, Anti-Corrosive Paints.
 - c) Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings.
7. Paints and coatings materials used to the exterior of the weatherproofing system shall not exceed the VOC content limits of the following criteria.
 - a) Exterior paints coatings: Green Seal GS-11; to following Green Seal VOC limits:
 - (i) Flat coating type: 100 gm/L.
 - (ii) Non-flat coating type: 200 gm/L.

2.2 Equipment

1. Painting and coating equipment in accordance with written requirements of MPI Manual (Masters Painter Institute).

2.3 Mixing & Tinting

1. Unless otherwise specified, paints shall be ready-mixed. Re-mix prior to application to ensure colour and gloss uniformity.
2. Paste, powder or catalysed paint mixes shall be mixed in accordance with manufacturer’s written instructions.
3. Perform colour tinting operations prior to delivery of paint to Place of the Work.
4. Where thinner is used, addition shall not exceed paint manufacturer’s recommendations.

2.4 Finish & Color

1. Final Paint finishes shall be as approved by the Client representative.
2. Colours: Prior to beginning painting work, Subcontractor will be furnished with copy of colour schedule. Colours as selected by Client representative.

PART 3 EXECUTION

3.1 Condition of Surfaces

1. Prior to commencement of work of this section, thoroughly examine surfaces scheduled to be painted.
2. Check moisture content and pH of surfaces to be painted in accordance with paragraph above titled Environmental Requirements.
3. Inspect surfaces to be coated for gouges, marks, nibs, and other defects and properly prepare patching, filling, smoothing or other surface preparation necessary to ensure satisfactory finish.
4. Report in writing any condition adversely affecting work of this section.
5. Proceed with work only when surfaces and conditions are satisfactory. Remove dust, grease, rust, scale and extraneous matter, tool and machine marks and insects from surfaces which could be detrimental to a satisfactory and acceptable finish.

3.2 Preparation

1. Prepare surfaces in accordance with MPI requirements. Refer to MPI Manual in regard to specific requirements.

3.3 Application

1. Do not paint unless substrates are acceptable and/or until environmental conditions (heating, ventilation, lighting and completion of work of other sections) are acceptable for applications of Products.
2. Apply primer, paint or stain in accordance with MPI Manual Premium Grade finish requirements.
3. Apply paint and coatings within an appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or manufacturer's paint specifications require earlier applications.
4. Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
5. Tint each coat of paint progressively lighter to enable confirmation of number of coats.
6. Unless otherwise approved by ASP/MPI inspector and Consultant, apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.
7. Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm (39").

8. Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
9. Prime coat of stain or varnish finishes may be reduced in accordance with manufacturer's directions.
10. Paint finish shall continue through behind wall-mounted items (i.e. chalk and tack boards).
11. Exposed means visible in complete work including interiors of cupboards and closets, tops of doors, trim, and the like, whether in sight line or not, including behind surface mounted fixtures and heating units.
12. Consultant shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to Owner.
13. Unless otherwise noted or scheduled, walls shall be painted same colour within a given area.
14. Access doors, prime coated butts and other prime painted hardware, registers, radiators and covers, exposed piping and electrical panels shall be painted to match adjacent surfaces in terms of colour, texture and sheen, unless otherwise indicated.

3.4 Mechanical & Electrical Items

1. Finish paint primed mechanical and electrical items with 2 coats of paint.
2. Prime and paint exposed insulated and bare pipes. Prime and paint exposed conduits and electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items. Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65°C.
3. Coordinate the painting of pipes, and coverings with mechanical contractor applying colour banding, flow arrows and pipe identification after the painting of pipes and coverings.
4. Paint work to match adjacent walls and ceilings unless directed otherwise.
5. Paint interior surfaces of air ducts and pipe trenches including heating pipes and elements that are visible through grilles and louvres with one coat of flat metal paint to limit of sight-line. Paint to be black or white as directed by Consultant.
6. Gas pipes, whether concealed or exposed, shall be painted in yellow-orange colour, in accordance with gas code.

3.5 Field Quality Control / Standard of Acceptance

1. Unless otherwise approved by APS/MPI inspector and Consultant, apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.
2. Painted exterior and interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the APS/MPI Inspector and Consultant:
 - a) Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 - b) Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

- c) Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - d) Damage due to application on moist surfaces or caused by inadequate protection from weather.
 - e) Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
3. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:
- a) Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39”).
 - b) Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39”).
 - c) Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 - d) When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area.
4. Painted surfaces rejected by the APS/MPI inspector and Consultant shall be made good at the expense of the Subcontractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.6 Cleaning

1. Promptly as work proceeds and on completion of Work, remove paint where spilled, splashed or spattered during the progress of the Work keep the premises free from unnecessary accumulation of tools, equipment, surplus materials and debris; at the conclusion of the work leave the premises clean.

END OF SECTION

PART 1 GENERAL

1. Comply with requirements of Division 1 and Supplementary Conditions.

1.1 Related work

1. Section includes: High-performance Anti-Graffiti coatings and special preparation of the following surfaces:
 1. Cast-in-place concrete.
 2. Precast concrete.
 3. Concrete unit masonry (CMUs).
 4. Mineral-based Paints

1.2 Submittals

1. Product Data: For each type of product.
 1. Include manufacturer's printed statement of VOC content.
 2. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

1.3 Informational Submittals

1. Qualification Data: For Applicator.
2. Manufacturers' literature for all materials specified for use on this project, each properly labeled and referenced to appropriate Specification Section, in time to prevent delay of the project.
3. Product Certificates: For each type of anti-graffiti coating
4. Safety Data Sheets (SDS) for all materials to be used.
5. Manufacturer's requirements and testing procedures for moisture conditions (moisture vapor emission rate, relative humidity, etc.) of the concrete at time of installation necessary to ensure proper bond.
6. Manufacturer's written instructions regarding equipment, materials and workmanship requirements for surface repairs, surface preparation, and installation of anti-graffiti coating materials.
7. Preconstruction Test Reports: For anti-graffiti-treated substrates.
8. Field quality-control reports.
9. Special Warranty Article

1.4 Closeout Submittals

1. Maintenance Data: For all anti-graffiti coatings to include in maintenance manuals.

1.4 Quality Assurance

1. Contractor and Installer Qualifications:

- a) The installer shall be licensed by the manufacturer of the products to be used on the project with a minimum of 5 yrs' experience in the application of similar impregnating anti-graffiti coatings and concrete repair materials.
 - b) The Contractor's site superintendent shall have at least 5 yrs' experience supervising the installation of antigraffiti coatings and concrete repair materials.
 - c) Upon request, provide the Engineer with a list of five representative projects successfully completed by the contractor that are of similar scope and size. For each project, provide the project name, Owner's name, Owner's Representative name and phone number, description of the work, name of Anti-Graffiti Coating or impregnating water-repellent applied, Project supervisor, total cost of the impregnating coating/treatment work vs. the total cost of the project, and the project completion date.
2. Mockups: Prepare mockups of each required anti-graffiti coating on each type of substrate required to demonstrate aesthetic effects, for preconstruction testing, and to set quality standards for materials and execution.
- a) Locate mockups in locations that enable viewing under same conditions as the completed Work a. Size: 25 sq. ft. (2.3 sq. m)
 - b) Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing. 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 - c) Manufacturer's Field Representative: The Contractor shall arrange with the manufacturer of the anti-graffiti coating to have the services of a competent field representative at the site to approve surface preparation before installation of the coating and any concrete repair material. The Manufacturer's Field Representative shall instruct the crew on proper installation of materials and observe the installation of the products at the beginning of the work. The Field Representative shall remain at the jobsite and continue to instruct until the field representative, Architect, and Owner's Representative are satisfied that the crew has mastered the technique of installing the products successfully

1.5 Pre-Construction Testing

1. Preconstruction Testing: Engage a qualified testing agency to perform preconstruction testing of anti-graffiti coating on field mockups.
 - a) In addition to verifying performance requirements, use mockups to verify manufacturer's written instructions for application procedure and optimum rates of product application to substrates.
 - b) Propose changes to materials and methods to suit Project.

1.6 Field Condition

1. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied in accordance with manufacturers' written instructions and warranty requirements:
 - a) Concrete surfaces have cured for not less than 28 days.
 - b) Any repointing completed must be and allowed to cure for at least 3 days.
 - c) If surface was treated with a silane water repellent agent, it must be allowed to cure for at least 5 days.
 - d) Building has been closed in for not less than 30 days before treating wall assemblies.
 - e) Ambient temperature is above 40 deg F (4.4 deg C) and below 85 deg F (29.4 deg C) and will remain so for 24 hours.
 - f) In direct sunlight resulting in temperatures outside of the range listed above.
 - g) Substrate is not frozen and substrate-surface temperature is above 40 deg F (4.4 deg C) and below 85 deg F (29.4 deg C).
 - h) Rain or snow is not predicted within 24 hours.
 - i) Not less than 24 hours have passed since surfaces were last wet.
 - j) Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 Warranty

1. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in "Performance Requirements" Article within specified warranty period for pre-application approval

PART 2 PRODUCTS

2.1 Graffiti Resistance Coating

1. Non-Sacrificial, Clear, Breathable, Penetrating Anti-Graffiti Coating Treatment: Containing 15 percent or more actives of organofluorosiloxane with a water carrier; and with 20 g/L or less of VOCs. Suitable for application to porous surfaces including masonry, concrete, stone, brick, CMU, and stucco. Dries invisible and is non-yellowing; Intended for use on both interior and exterior surfaces. Will provide exceptional protection against a wide-variety of graffiti materials, including spray paint, marker, ink, bituminous paints, asphalt sealers and other solvent or waterborne paints using a non-hazardous cleaner and low-pressure water-blasting.
2. Basis-of-Design Product: Subject to compliance with requirements, provide Ghostshield; KreteTek Industries, Inc.; ISO-TEK™ 8515 AG OR Equal.

PART 3 EXECUTION

3.1 Examination

1. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.
2. Verify that surfaces are clean and dry in accordance with manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.
3. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of anti-graffiti treatment.
4. Verify that required repairs are complete, cured, and dry before applying anti-graffiti treatment.
5. Test pH level in accordance with anti-graffiti treatment manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.
6. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 Preparation

1. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, in accordance with repellent manufacturer's written instructions.
2. Cleaning: Before application of anti-graffiti treatment, clean substrate of substances that could impair penetration or performance of product in accordance with anti-graffiti treatment manufacturer's written instructions or as follows:
 - a) Cast-in-Place Concrete, Precast Concrete, Cast Stone, and Concrete Unit Masonry: Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of anti-graffiti treatment in accordance with ASTM E1857
 - b) Clay Brick Masonry: ASTM D5703.
 - c) Natural Stone: ASTM C1515 or ASTM D5107.
 - d) Portland Cement Plaster (Stucco): ASTM E1857
3. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of anti-graffiti treatment. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of anti-graffiti treatment being deposited on surfaces. Cover live vegetation.
4. Coordination with Mortar Joints: Do not apply anti-graffiti treatment until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.
5. Coordination with Sealant Joints: Do not apply anti-graffiti treatment until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.
 - a) Anti-graffiti treatment work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, anti-graffiti treatment, and sealant materials identical to those required.

3.3 Application

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of anti-graffiti coating and to instruct Applicator on the product and application method to be used.

2. Apply anti-graffiti coating to prepared substrates within three days after completion of the surface preparation.
3. Stir material thoroughly before and during application. Do not dilute or alter material for purposes other than specified.
4. Application rates are dependent on porosity and surface roughness of substrate. Follow manufacturers published instructions.
5. Test in an inconspicuous area to ensure the desired coverage and appearance is achieved.
6. Anti-graffiti coating is best applied using a HLVP (High Volume Low Pressure) gun sprayed 12-18" away from the surface. It is recommended to apply using a fine spray. Apply primer coat directly to substrate and ensure liquid is distributed evenly. Water-repellent effect may appear within a few minutes.
7. (2) Two additional applications at full strength may be required for permanent graffiti protection. Before applying second and third coat, allow surface to dry completely. If second and third coat are being repelled by primer coat, the addition of up to 1 cup (8 ounces) of isopropyl alcohol per gallon of anti-graffiti is permitted. Once isopropyl alcohol is added, there is a shortened pot life of 8 hours.
8. Do NOT apply sealer to concrete surfaces
 - a) that are damp or have damp repairs. If rain suddenly begins during installation, immediately stop application of sealer and cover the newly impregnated areas.
 - b) if the conditions (e.g., weather or surface conditions) do not meet the requirements of Para. 1.8 above or are not expected to meet the requirements for anytime within a 24 hr. period after installation.
9. Do not disturb sealed surfaces for a minimum of 6 hrs after the application of the product.

3.4 Field Quality Control

1. Testing of Anti-Graffiti Coating: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when Anti-Graffiti Coating is being applied:
 - a) Owner will engage the services of a qualified testing agency to sample water-repellent material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - b) Testing agency will perform tests for compliance of anti-graffiti material with product requirements.
 - c) Owner may direct Contractor to stop applying anti-graffiti if test results show material being used does not comply with product requirements. Contractor shall remove noncomplying material from Project site, pay for testing, and correct deficiency of surfaces treated with rejected materials, as approved by Architect

3.5 Cleaning

1. Immediately clean anti-graffiti coating from adjoining surfaces and surfaces soiled or damaged by anti-graffiti coating application as work progresses.
2. Comply with manufacturer's written cleaning instructions.

END OF SECTION

1 General

1.01 Section Includes

- .1 Common requirements for Mechanical Work.
- .2 Provisions of this Section shall apply to all Sections of Division 21, Division 22, Division 23, and Division 26.
- .3 This section shall be read in conjunction with Division 00 and Division 01 specifications. Division 00 and Division 01 documents take precedence.
- .4 Refer to the General Conditions, Supplementary General Conditions, and General Requirements.
- .5 Refer to Architect or Interior Designer’s drawings for exact location of electrical equipment and devices. Refer to Designer drawings for additional notes which complement these specifications.

1.02 Related Requirements

- .1 Division 07 – Firestopping.

1.03 Intent

- .1 Include all material, labour, equipment, and plant construction as necessary to make a complete installation as shown and specified hereinafter.
- .2 Sections of this specification are not intended to delegate functions nor to delegate work and supply to any specific Trade. It shall be your responsibility to ensure that the systems specified hereafter are complete and operative.
- .3 Complete systems shall be left ready for continuous and efficient satisfactory operation.

1.04 Drawings and Specifications

- .1 The drawings and specifications are complementary each to the other and what is called for by one to be binding as if called for by both. Should any discrepancy appear between the drawings and specifications, which leaves the Contractor in doubt as to the true intent and meaning of plans and specifications, a ruling is to be obtained from the Engineer in writing before submitting Bid. If this is not done, the maximum, the most expensive alternate or option will be provided in base tender bid.
- .2 All drawings and all Divisions of these specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division.
- .3 Drawings are diagrammatic and indicate the general arrangement of equipment and pathways. Most direct routing of conductors and wiring is not assured. Exact requirements shall be governed by architectural, structural, and mechanical conditions of the job. Consult all other drawings in preparation of the bid. Extra lengths of wiring or addition of pull and junction boxes, etc. necessitated by such conditions shall be included in the bid. Check all information and report and apparent discrepancies before submitting the bid.

- .4 Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pathways so as to best fit the layout of the job.
- .5 Scaling off the drawings will not be sufficient or accurate for determining these locations. Where job conditions require reasonable changes in indicated arrangement and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
- .6 Because of the scale of the drawings, certain basic items, such as junction boxes, pull boxes, conduit fittings, etc. may not be shown, but where such items are required by other sections of the specifications of where there are required for proper installation of the work, such items shall be furnished and installed.
- .7 Before ordering any piping, fittings, etc., this Contractor shall verify all pertinent dimensions at the job site and be responsible for their accuracy.
- .8 If obvious ambiguities or omissions are noticed when tendering refer same to the Consultant for a ruling and obtain the ruling in writing in the form of an Addendum. Claims for extras for ambiguities or omission of items brought to the attention of the Consultant after the award of a contract which, due to the nature of the ambiguity or omission, should have been brought to the attention of the Consultant during the tendering period, will not be allowed.
- .9 The drawings are performance drawings, diagrammatic, and show locations for apparatus and materials. The drawings are intended to convey the scope of work and do not intend to show Architectural and Structural details. The locations shown are approximate, and may be altered, when approved by the Consultant, to meet requirements of the material and/or apparatus, other equipment and systems being installed, and of the building. Do not scale drawings.
- .10 Provide any fitting, offset, transformation, etc., required to suit architectural and structural details but not shown.

1.05 Work Restrictions

- .1 Refer to Division 01.
- .2 All work in the existing building, other than minor works required to permit construction of the new addition, is to be performed in such a manner as to not disrupt the building operations.
- .3 All systems are to be kept in full operation during normal building hours.
- .4 Note that any noise generating works that disrupt the building operation shall be coordinated accordingly and carried out after/before normal operating hours.
- .5 Co-ordinate with the Owner, and refer to General Conditions.
- .6 Examine the existing building, the site and surrounding areas and be fully informed as to the conditions and limitations under which the work has to be executed. Claims for additional costs will not be entertained with respect to conditions which could reasonably be ascertained by an inspection prior to Tender closing.

- .7 Do work in existing areas to best suit available space and not interfere with or obstruct use of existing facilities.
- .8 Cut, modify, or extend as necessary or as directed by the Architect, the existing material or equipment to be reused or relocated to suit work under this Contract.
- .9 Where disruptions of existing services are required, coordinate shut down with the Owner's Operating Staff and do the work at a time and in a manner mutually acceptable. Carefully schedule disruptions to keep "Down Time" to a minimum.
- .10 Do all cutting, patching and making good to leave in a finished condition and to make the several parts of the Work come together properly. Co-ordinate work to keep cutting and patching to a minimum.
- .11 Quality of workmanship and materials used in patching, making good and refinishing of existing construction and/or compartments shall be of a standard equal to that specified for new construction and if not specified, equal to or exceeding that of original existing work.
- .12 Existing materials and equipment which are to be used in new work shall be repaired and refinished as necessary. Provide additional new materials and components as required to facilitate reinstallation of such existing materials and equipment.
- .13 Prior to cutting openings, examine wall, floor and ceiling construction for buried electrical cables and pipes; and take adequate protection. Conduct cable locating tests to locate buried cables in existing work.

1.06 Cash Allowances

- .1 Cash allowances will be carried as indicated in Division 01 for the items indicated, each including all equipment, wiring material, labour, incidentals, profit, overhead, taxes, etc.

1.07 Substitution Procedures

- .1 Refer to Division 01.
- .2 See General Provisions of the Contract.
- .3 Additionally, "Approved Equal" shall be defined as an alternate approved by the engineers.
- .4 If during the tender bid process, the bidding contractor wishes to substitute the specified equipment for an "Approved Equal", the bidding contractor must submit shop drawings to the engineer before the tender close for approval. If no substitution request is made, the as-specified equipment is that to be provided.
- .5 Where several manufacturers' names are given, the first named manufacturer constitutes the basis for job design and establishes the equipment quality required to be used in this contract.
- .6 This contractor, at his option, may use equipment as manufactured by the other manufacturers if listed. This contractor is responsible to ensure that all items submitted by these other manufacturers meets are

requirements of the drawings and specification and fits in the allocated space. The final determination of a product being equivalent shall be determined by the Engineer when a catalog number is not listed, or listed in part.

- .7 Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Engineer as described in the General Provisions of the Contract for Submittals. The Contractor bears full responsibility for the unnamed manufacturers' equipment adequately meeting the intent of the design. The Owner/Engineer may reject manufacture at time of shop drawing submittal.

1.08 Coordination

- .1 Refer to Division 01.
- .2 Coordinate work with other trades to avoid conflict and to provide correct rough-in and connection for equipment furnished under other trades that require electrical connection. Inform Contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.
- .3 Verify equipment dimensions and requirements with provision specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work. Changes or additions subject to additional compensation, which are made without written authorization and an agreed price, shall be at Contractor's risk and expense.
- .4 Read specifications and drawings of other trades and conform with their requirements before proceeding with any work specified in this Division related to other trades. Cooperate with all other trades on the job, so that all equipment can be satisfactorily installed, and so that no delay is caused to any other Trades.
- .5 Coordinate utility service outages with the owner. Obtain permission from Owner at least 24 hours before partially or completely disabling system. Minimize outage duration.
- .6 Existing Fire Alarm System: Maintain existing system in service. Disable system only to make switch overs and connections. Notify Owner at least 24 hours before partially or completely disabling system. Minimize outage duration.
- .7 Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- .8 Co-ordinate work with all trades to ensure a proper and complete installation. Notify all trades concerned of the requirement for openings, sleeves, insets and other hardware necessary for the installation and, where work is to be integrated with the work of other trades or is to be installed in close proximity with the work of other trades, carefully co-ordinate the work prior to installation.
- .9 Working Detail Drawings

- .1 Note that for mechanical work, you will be required to prepare working detail drawings supplementary to the contract drawings, when deemed necessary by the Consultant, for all areas where a multiplicity of materials and or apparatus occur, or where the work due to architectural and structural considerations involves special study and treatment. Such drawings may be prepared jointly by all trades affected, or by the one (1) trade most affected with due regard for and approval of the other trades, all as the Consultant will direct in each instance. Such drawings must be reviewed by the Consultant before the affected work is installed.
- .2 Carry out all alterations in the arrangement of work which has been installed without proper study and approval, even if in accordance with the contract documents, in order to make such work come within the finished lines of walls, floors and ceilings, or to allow the installation of other work, without additional cost. In addition, make any alterations necessary in other work required by such alterations, without additional cost.

1.09 Submittal Procedures

- .1 Refer to Division 01.
- .2 Before delivery to site of any item of equipment, submit shop drawings complete with all data, pre-checked and stamped accordingly, for review by the Consultant. . Indicate project name on each brochure or sheet, make reference to the number and title of the appropriate specification section, type identifier such panel board ID or luminaire type as indicated on appropriate schedule, and provide adequate space to accommodate the Consultant's review stamp(s).
- .3 Verify field measurements and affected adjacent Work are coordinated, including passageway clearances for movement of equipment into location.
- .4 Shop Drawings
 - .1 Submit for review, properly identified shop drawings showing in detail the design and construction of all equipment and materials as requested in sections of the specification governed by this Section.
 - .2 Identify the equipment by system name and number, eg. "HV-1 - Heating and Ventilation unit". "P1 - sanitary sump pump" etc.
 - .3 Obtain and comply with the manufacturer's installation instructions.
 - .4 Endorse each shop drawing copy "CERTIFIED TO BE IN ACCORDANCE WITH ALL REQUIREMENTS", stamp each copy with your company name, date each copy with the submittal date, and sign each copy. Shop drawings which are received and are not endorsed, dated and signed will be returned for re-submittal.
 - .5 The Consultant will stamp shop drawings as follows:
 - .1 Reviewed ()
 - .2 Reviewed As Modified ()

- .3 Revise and Re-Submit ()
- .4 Not Reviewed ()
- .6 If "REVIEWED" is checked-off, the shop drawing is satisfactory. If "REVIEWED AS MODIFIED" is checked-off, the shop drawing is satisfactory subject to requirements of remarks put on shop drawing copies. If "REVISE AND RE-SUBMIT" is checked-off, the shop drawing is entirely unsatisfactory and must be revised in accordance with comments written on shop drawing copies and resubmitted. If "NOT REVIEWED" is checked-off, the shop drawing is in error of submission, not applicable for this project.
- .7 This review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approved the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of 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 co-ordination of the work as well as compliance with codes and inspection authorities such as CSA, etc.

1.10 Safety Requirements

- .1 Refer to Division 01.
- .2 Each contractor shall be responsible for the safety of his workmen and the equipment on the project in accordance with all applicable safety legislation passed by Federal, Provincial, and local authorities governing construction safety. The more stringent regulations shall prevail.

1.11 Regulatory Requirements

- .1 Refer to Division 01.
- .2 Codes and Standards
 - .1 Ontario Electrical Safety Code c/w Bulletins and Amendments.
 - .2 Ontario Building Code and its referenced standards.
 - .3 Applicable C.S.A. and ULC Standards.
 - .4 All work shall be in accordance with Owner's Design Guidelines.
- .3 Permits and Fees
 - .1 Obtain and pay for all permits and fees required for the execution and inspection of the electrical work and pay all charges incidental to such permits. Submit to Electrical Inspection Department and Supply authority necessary number of drawings and specifications for

examination and approval prior to commencement of work. Arrange and pay for any special inspection of equipment specified if and when required.

- .2 Apply, pay and obtain all permits as required for the mechanical work.
- .3 Upon substantial completion of your work, supply and turn over to the Consultant all required inspection certificates from governing authorities to certify that the work as installed conforms to the rules and regulations of the governing authorities.
- .4 Patents
 - .1 Pay all royalties and licence fees, and defend all suits or claims for infringement of any patent rights, and save the Owner, Architect, Project Manager and Consultants harmless of loss or annoyance on account of suit, or claims of any kind for violation or infringement of any letters patent or patent rights, by this Subcontractor or anyone directly or indirectly employed by him or by reason of the use by him or them of any part, machine, manufacture or composition of matter on the work, in violation or infringement or such letters patent or rights.

1.12 References

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
 - .2 CAN3-C235-83(R2006), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
 - .3 Do underground systems in accordance with CSA C22.3 No.7-06, Underground Systems, except where specified otherwise.
 - .4 Ontario Electrical Safety Code, 25th Edition / 2012.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
 - .1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Ontario Electrical Safety Code, 25th Edition / 2012, and all bulletins.
- .5 Hydro requirements and local applicable codes and regulations.
- .6 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.13 Definitions

- .1 The following are definitions of words found in Sections of the Specification governed by this Section, and on associated drawings:
 - .1 "Concealed" - hidden from normal sight in furred spaces, shafts, crawl spaces, ceiling spaces, walls and partitions;
 - .2 "Exposed" - all mechanical and electrical work normally visible to building occupants;
 - .3 "Provide" (and tenses of "Provide") - supply, install and connect complete.
 - .4 "Install" (and tenses of "install") - install, and connect complete;
 - .5 "Supply" - supply only.
 - .6 "Work" - all equipment, permits, materials and labour to provide a complete mechanical Installation as required and detailed in Drawings and Specification.
 - .7 "Authorities" or "Authorities Having Jurisdiction" - any and all current laws and/or by-laws of any federal, provincial or local authorized agencies having jurisdiction over the sum total or parts of the work including, but not restricted to the Municipal Planning and Building Department, Municipal Fire Department, Plumbing Regulations, Gas Utilization Code, The Construction Safety act, Municipal Public Works Department, the Canadian Electrical Code, and Ontario Electrical Safety Code..
 - .8 "Drawings and Specifications" - "the Contract Drawings and Specifications".

1.14 Quality Assurance

- .1 Refer to Division 01.
- .2 The specifications contained herein are set forth as the minimum acceptable requirements. This does not relieve the Contractor from executing other quality assurance measures to obtain a complete operating system within the scope of this project.
- .3 The Contractor shall ensure that all workmanship, all materials employed, all required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.
- .4 Provide quality assurance tests and operational check on all components of the electrical distribution system, all lighting fixtures, and communication systems.
- .5 Only first class workmanship will be accepted, not only in regards to durability, efficiency and safety, but also in regards to neatness of detail. Present a neat and clean appearance on completion to the satisfaction of the Engineer. Any unsatisfactory workmanship will be replaced at no extra cost.

- .6 Conform to the best practices applicable to this type of work. Install all equipment and systems in accordance with the manufacturer's recommendations, but consistent with the General Requirements of this specification. Electrical Contractor will be held responsible for all damage to the work of his own or any other trade, resulting from the execution of his work. Store all electrical equipment and materials in dry locations.
- .7 Provide foreman in charge of this work at all times.
- .8 The contractor shall be fully liable to provide and maintain in force during the life of this Contract, such insurance, including Public Liability Insurance, Product Liability Insurance, Auto Liability Insurance, Worker's Compensation, and Employer's Liability Insurance.
- .9 Governing Federal, Provincial and Municipal codes and regulations will be considered minimum standards for the mechanical work and where these are at variance with the drawings and specification, the more stringent ruling will apply.
- .10 Where any code, regulation, by-law or standard is quoted it shall mean the current edition including all revisions or amendments at the time of the tender.
- .11 In case of conflict, the codes and regulations take precedence over the Contract Documents. In no instance reduce the standard or scope of work or intent established by the drawings and specifications by applying any of the codes referred to herein.

1.15 Quality Control

- .1 Refer to Division 01.
- .2 Provide a full time Superintendent to oversee and coordinate all sub-trades in Mechanical Divisions.

1.16 Temporary Utilities

- .1 Refer to Division 01.
- .2 Do not use any of the permanent Mechanical Systems during construction except as may be specified, or unless written approval is obtained from the Consultant.
- .3 The use of permanent facilities for temporary construction service will not affect in any way the commencement day of the warranty period.
- .4 Temporary heating during the construction period will be provided as described in Division 01.

1.17 Temporary Facilities and Controls

- .1 Refer to Division 01.
- .2 Prior to start of each work period in occupied area, temporary protection shall be installed to prevent damage to any personal property or furnishing. Coordinate with Owner's representative if any furniture must be relocated to facilitate work.

- .3 Owner's representative shall approve temporary protection plan prior to use.
- .4 Necessary steps shall be taken by contractor to ensure that required fire fighting apparatus is accessible at all times. Flammable materials shall be kept in suitable places outside the building.

1.18 Product Requirements

- .1 Refer to Division 01.
- .2 The design, manufacture and testing of electrical equipment and materials shall conform to or exceed the latest applicable CSA, IEEE, and ANSI standards.
- .3 All materials must be new and be ULC or CSA listed. Any materials not covered by the aforementioned listing standards shall be tested and approved by an independent testing laboratory, Technical Inspection Services, or other government agency.
- .4 Materials and equipment are specifically described and named in this Specification in order to establish a standard of material and workmanship.
- .5 Materials required for performance of work shall be new and the best of their respective kinds and of uniform pattern throughout work.
- .6 Materials shall be of Canadian manufacture where obtainable. Materials of foreign manufacture, unless specified, shall be approved before being used.
- .7 Equipment items shall be standard products of approved manufacture. Identical units of equipment shall be of same manufacture. In any unit of equipment, identical component parts shall be of same manufacture, but the various component parts comprising the unit need not be of one manufacture.
- .8 Chemical and physical properties of materials and design performance characteristics and methods of construction and installation of items of equipment, specified herein, shall be in accordance with latest issue of applicable Standards or Authorities when such are either mentioned herein, or have jurisdiction over such materials or items of equipment.
- .9 Materials shall bear approval labels as required by Code and/or Inspection Authorities.
- .10 Install materials in strict accordance with manufacturer's recommendations.
- .11 Include items of material and equipment not specifically noted on Drawings or mentioned in Specification but which are necessary to make a complete and operating installation.
- .12 Remove materials, condemned as not approved for use, from job site and deliver and install suitable approved materials in their place.
- .13 Unless otherwise noted, equipment and material specifications in Sections of the Specification governed by this Section are based on products of a manufacturer selected by the Consultant for the purpose of setting a standard of quality, size, performance, capacity, appearance and serviceability.

- .14 In most instances the names of acceptable manufacturers are also stated for materials and equipment, and you may base your tender price on equipment and materials produced by either the specified manufacturer or a manufacturer listed as acceptable.
- .15 For any items of equipment, material, or for any system where acceptable manufacturers are not stated, you must provide only the equipment, material or system specified.
- .16 If materials or equipment manufactured and/or supplied by a manufacturer named as acceptable are used in lieu of products of the manufacturer specified, be responsible for ensuring that the substituted material or equipment is equivalent in size, performance and operating characteristics to the specified materials or equipment, and it shall be understood that all costs for larger starters, additional space, larger power feeders, and changes to associated or adjacent work required as a result of providing materials and equipment named as acceptable in lieu of the specified product will be borne by Contractor.
- .17 In addition to the manufacturers specified or named as acceptable, the Contractor may propose alternative manufacturers of equipment and/or apparatus to the Consultant for acceptance, listing in each case a corresponding credit for each alternative proposed, however, your tender price must be based on apparatus or materials specified or named as acceptable. Certify in writing to the Consultant that the alternative meets all space, power, design, and all other required of the specified or equivalent material or apparatus. In addition, it shall be understood that all costs for larger starters, space, power feeders, and changes to associated equipment, mechanical and/or electrical, required by acceptance of proposed alternatives, will be borne by the party making the proposal. Alternative equipment requiring greater than specified energy requirements or unduly limiting service space requirements will not be accepted.
- .18 Where a manufacturer is not listed for a particular product, it will be deemed to mean that you are supplying the specified manufacturer's product.

1.19 Examination and Preparation

- .1 Refer to Division 01.
- .2 Examine the existing equipment, the site and surrounding areas and be fully informed as to the conditions and limitations under which the work has to be executed. Claims for additional costs will not be entertained with respect to conditions which could reasonably have been ascertained by an inspection prior to Tender closing.
- .3 Examine work upon which your work depends. Report in writing defects in such work. Application of your work shall be deemed acceptance of work upon which your work depends.
- .4 Drawings are, in part, diagrammatic and are intended to convey scope of work and indicate general and approximate location, arrangement and sizes of equipment, piping, and similar items. Obtain more accurate information about locations, arrangement and sizes from study and coordination of drawings, including shop drawings and manufacturers' literature and become familiar with conditions and spaces affecting these matters before proceeding with work.

- .5 Where job conditions require reasonable changes in indicated locations and arrangements, make such changes with approval of the Consultant at no additional cost to the Owner. Similarly, where existing conditions interfere with new installation and require relocation, such relocation is included in work.

1.20 Cutting and Patching

- .1 Refer to Division 01.
- .2 The Electrical Contractor will be responsible for all cutting and patching required for the electrical installation. Structural members are not to be cut without the consent of the Engineer.
- .3 All cutting and patching performed by Division 26 shall be in accordance with Division 02, Cutting and Patching. Layout such work for approval before undertaking same.
- .4 Cutting shall be kept to an absolute minimum and performed in a neat and workmanlike manner using the proper tools and equipment. Caution shall be exercised in all cutting and procedures to ensure that concealed services are not affected. Do not cut if in doubt. Request Consultant's presence to determine if concealed services exist.
- .5 Assume responsibility for prompt installation of Work in advance of concrete pouring or similar Work. Should any cutting or repairing of finished/unfinished Work be required because such installation was not done, employ the particular trade, whose Work is involved, to do such cutting and patching. Pay for any resulting costs. Layout such Work for approval before undertaking same.

1.21 Cleaning and Waste Management

- .1 Refer to Division 01.
- .2 The Contractor and associated sub trades, at all times during construction, to keep the site free of all debris, boxes, packing, etc., resulting from work of this Trade. At the completion of this work, the electrical installation is to be left in a clean and finished condition to the satisfaction of the Engineer.
- .3 Clean and repair existing materials and equipment which remain or are to be reused.
- .4 Luminaires to be reinstalled: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.
- .5 Assume responsibility for removing tools and waste materials on completion of Work, and leave Work in clean and perfect condition.

1.22 Starting and Adjusting

- .1 Refer to Division 01.
- .2 This contractor shall conduct acceptance tests to demonstrate that the equipment and systems actually meet the specified requirements. Tests may be conducted as soon as conditions permit, and consequently the contractor shall make all changes, adjustments, or replacements required as the

preliminary tests may indicate prior to the final tests. Tests shall be as specified in various sections of this Division. Carry out tests in the presence of the Engineer. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project. The Electrical Contractor shall be in charge of the plant during tests. He shall assume responsibility for damages in the event of injury to the personnel, building, equipment, and shall bear all costs for liability, repairs, and restoration in this connection. Submit test results.

- .3 Make tests of equipment and wiring at times requested.
- .4 Tests shall include meggered insulation values, voltage and current readings to determine balance of panels and feeders under full load, and operation of each piece of equipment for correct operation.
- .5 Supply meters, materials and personnel as required to carry out these tests.
- .6 Test electrical work to standards and function of Specification and applicable codes in an approved manner. Replace defective equipment and wiring with new material and leave entire system in complete first class operating condition.
- .7 Connect single phase loads so that there is the least possible unbalance of the supply phases.
- .8 Submit all test results in report format.
- .9 Trial Usage
 - .1 The Consultant reserves the right to use any system, piece of equipment, device, or material for such reasonable lengths of time and at such times as may be required to make a complete and thorough test of the same, or for the purpose of learning operational procedures, before the final completion and acceptance of the work. Such tests shall not be construed as evidence of acceptance of the work, and it is agreed and understood that no claim for damage will be made for injury or breakage to any part or parts of the above due to the aforementioned tests, where such injuries or breakage are caused by a weakness or inaccuracy of parts, or by defective materials or workmanship of any kind. Supply all labour and equipment required for such tests.
 - .2 Perform and pay for all costs associated with any testing required on the system components where, in the opinion of the Consultant the equipment manufacturer's ratings or specified performance is not being achieved.

1.23 Closeout Procedures

- .1 Refer to Division 01.
- .2 The Engineer will carry out inspections and prepare deficiency list for action by the Contractor, during and on completion of project.
- .3 Furnish a Certificate of Acceptance from Inspection Department on completion of work.

1.24 Closeout Submittals

- .1 Refer to Division 01.
- .2 Project Record Documents
 - .1 Extra sets of white prints will be provided on which to make, as the job progresses, all approved changes and deviations from the original drawings. Complete Record Drawings accurately marked up in red ink must be submitted for approval before the contract is considered to be completed.
 - .2 Changes and deviations shall include those made by addenda, change orders, and site instructions, and changes and deviations to be marked on the white print record drawings indicated on supplemental drawings issued with addenda, change orders, and site instructions. Maintain the "as-built" white prints at the site for periodic inspection by the Consultant throughout the duration of the work.
 - .3 Upon substantial completion of the work, obtain a set of reproducible White print of the mechanical work drawings and neatly amend the print in accordance with the marked-up white prints to produce a true "as-built" set of mechanical work drawings.
 - .4 Obtain AutoCAD Drawings from the Consultant and transfer the information onto the diskettes and submit the diskettes, to the Consultant for review.
- .3 As-Built Drawings
 - .1 Submit three (3) USB Memory Stick of as-built drawings in AutoCAD format, one with each O&M manual.
 - .2 Provide three (3) sets of full size as-built drawings in Hard Copy format, one with each O&M manual.
 - .3 As-built drawings are to indicate all circuiting as installed and all distribution junction box locations as well as conduit routes.
 - .4 Trace routing of existing panelboard feeders for all panelboards and indicate on as-built drawings.
 - .5 AutoCAD files will be provided by the Engineer at a cost of \$75 per drawing.
 - .6 Provide in Main Electrical Room one wall mounted copy of as-built Single Line Diagram on ¼" foam board. As-built Single Line to indicate manufacturer name and cat no. of as-installed products.
- .4 Operations and Maintenance Data
 - .1 See General Provisions of the Contract.
 - .2 Submit three (3) copies of operation manuals or as specified by the owner.

- .3 Provide USB memory stick of the O&M manuals.
- .5 Submit three (3) complete sets of Operation and Maintenance Instruction Manuals. Each copy of the manual shall also include:
 - .1 Verification certificates for installation of HVAC systems by the manufacturer's representative.
 - .2 A copy of "reviewed" shop drawings.
 - .3 Complete explanation of operating principles and sequences.
 - .4 Recommended maintenance practices and precautions.
 - .5 Complete wiring and connection diagrams.
 - .6 Certificates of guarantees.
- .6 Ensure that operating and maintenance instructions are specific and apply to the model and types of equipment provided.
- .7 Warranty
 - .1 Submit a written guarantee to the Owner for one year from the date of acceptance. This guarantee shall bind the contractor to correct, replace or repair promptly any defective equipment workmanship without cost to the Owner.
- .8 Warranties
 - .1 All equipment, materials and workmanship shall be unconditionally guaranteed for a minimum period of one year from the date of acceptance.
 - .2 Provide warranty certificates, wherever given or required, in excess of the normal warranty period showing the name of the firm giving the warranty, dated and acknowledged, on specific equipment and systems.
 - .3 Warranties for temperature controls and building automation systems will start on the date of verification of acceptance by the Consultant.
 - .4 Include these certificates with the maintenance and operating manuals in the appropriate sections.
- .9 Provide the following on completion of the work:
 - .1 As constructed drawings.
 - .2 Operating and maintenance manuals.
 - .3 Air and water balancing reports.

1.25 Demonstration and Training

- .1 Instruct the Owner's designated representatives in all aspects of the operation and maintenance of systems and equipment listed in the trade sections governed by this Section. Obtain in writing from the Consultant a list of the Owner's representatives qualified to receive instructions.
- .2 Arrange for and pay for the services of qualified service technicians and other manufacturer's representatives required for instruction of specialized portions of the installation.

2 Products

2.01 Mechanical Identification

- .1 In accordance with Section 22 05 53.

3 Execution

3.01 Demolition

- .1 Refer to Division 02 and Division 22.
- .2 Remove all electrical equipment and devices on redundant structures. Make safe all circuits, and provide continuity of remaining circuits.
- .3 To make safe: Withdraw redundant wiring and remove unwanted conduit/wiring and accessories. Position breakers to OFF position and update panel schedules.
- .4 Make safe any redundant mechanical devices as shown on Mechanical Drawings.
- .5 Maintain continuity of existing services for other circuits/devices serving areas outside the Work area. Provide additional wiring/conduits/boxes etc. to suit existing services to be maintained and also implement new Work as detailed.
- .6 Allow for this work in Tender Price.
- .7 Turn over designated equipment to the Owner. Dispose of unwanted materials and equipment.

3.02 Concrete Work

- .1 Provide all concrete work required for the electrical work. Reinstall surfacing as per architectural requirements.

3.03 Lintels

- .1 Lintels for openings in masonry shall conform with requirements of By-Laws and as approved by the Structural Engineer.

- .2 Pay all costs for lintels over openings, required solely by the mechanical trades, not shown on architectural or structural drawings.

3.04 Metals

- .1 Steel construction required solely for the work of mechanical trades and not shown on architectural or structural drawings shall be provided by this Division to the requirements of Division 05.

3.05 Firestopping

- .1 Refer to Division 07.
- .2 Provide ULC classified firestopping products by 3M or Hilti which have been tested in accordance with CAN4-S115.
- .3 Ensure that fire ratings of floors and walls are maintained.
- .4 Pack clearance spaces, fill all spaces between openings, pipes and ducts passing through fire separations and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.
- .5 Install firestopping systems using personnel trained or instructed by the product manufacturer.

3.06 Access Doors

- .1 Provide access doors as manufactured by Lehage, Milcor or Acudor.
- .2 Lay-in type ceiling tiles, properly marked, with Lamicoïd label on adjacent ceiling carrying channel, may serve as access panels. Where ceiling tiles are required to be clipped, provide the appropriate access clips.
- .3 Provide for plaster surfaces recessed 16 ga. prime painted steel door and welded metal lath, ready to take plaster.
- .4 Provide for tiled surfaces, recessed type 16 ga. primed steel doors to suit type of tile used.
- .5 Provide other access doors of welded 12 gauge steel, factory prime coated, flush type.
- .6 Provide all doors minimum 300 mm x 300 mm (12" x 12"). Provide 600 mm x 600 mm (24" x 24") where personnel entry is required.
- .7 When access doors are required to be located in fire rated walls, floor and ceilings, provide U.L.C. tested and labelled units rated in accordance with the structures being penetrated ie. 3/4 HR., 1 HR., 2 HR.
- .8 Provide access doors to give access to all valves, cleanouts, strainers, duct access doors, and other mechanical devices which may need maintenance or repair which are concealed in inaccessible construction.

- .9 Locate access doors in walls and partitions to the Architect's approval, and arrange mechanical work to suit.
- .10 Group piping and ductwork to ensure the minimum number of access doors is required. Access doors will be installed by the trade responsible for the particular type of construction in which the doors are required.
- .11 Access doors shall be, wherever possible, of a standard size for all applications. Confirm exact dimensions prior to ordering.

3.07 Flashing

- .1 Flash all mechanical parts passing through roof or built into an outside wall, or a waterproof floor.
- .2 Provide copper flashing for sleeves passing through exterior walls or waterproof floors.

3.08 Finishes

- .1 Refer to Finishes division .
- .2 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .3 Repair and finish factory finished equipment, damaged or scratched during installation, in an approved manner.
- .4 All structural steel including hangers, brackets, supports and other ferrous metals shall be shop or factory prime painted wherever practicable. Wherever structural steel including hangers, brackets, supports, and other ferrous metals cannot be shop or factory prime painted, wire brush to remove all traces of rust, clean of all traces of dirt, oil, and grease, and apply one coat of an approved rust inhibiting primer in accordance with CGSB-GB-40d and leave ready to receive finish paint.
- .5 Primary and final painting for Work, other than items specified as factory primed or finished, will be performed as described in Finishes division.
- .6 All electrical fittings, supports, hanger rods, pull boxes, channel frames, conduit racks, outlet boxes, brackets, clamps etc., to have galvanized finish or paint finish over corrosion-resistant primer.
- .7 All panel boards, motor starters etc., to be factory finished with baked on enamel. All enamel to be baked on gloss over corrosion resistant primer.
- .8 Minor damages to finish on factory finished equipment shall be touched up to the Engineer's satisfaction. Items suffering major damage to finish shall be replaced at the direction of the Engineer.
- .9 Protect work so that finishes will not be damaged or marred during construction. Maintain the necessary protection until completion of the work.

- .10 Provide all exposed ferrous metal work on equipment with at least one factory prime coat, or paint one prime coat on job. Clean up or wire brush all equipment, etc., before painting. This Division is not required to prime coat or paint ductwork or piping. Paint gas piping as per code requirements.
- .11 For factory applied finishes, repaint or refinish surfaces damaged during shipment, erection or construction work.

3.09 Electrical Components and Wiring

- .1 A starter, and/or start/stop station as required, together with required pilot lights, remote switches and auxiliary contacts shall be supplied by trade Section of Mechanical Divisions for each motor or electrical item requiring control provided by that trade. This equipment shall be submitted to Division 26 for installation.
- .2 Where individual starters and controls are grouped together, a panel for mounting this equipment shall be provided by Contractor under Electrical Division 26.
- .3 Conduit and wiring to line side of remotely located starters or to line terminals of Motor Control Centres and from these points to a disconnect and/or motor will be provided under the Electrical Division 26.
- .4 Wiring to water unit heaters and cabinet unit heaters will be under Electrical Division 26. Wiring and conduit required for a thermostat will be provided by Mechanical Divisions under Division 23.
- .5 Mechanical Divisions will provide all control wiring regardless of voltage for all of the equipment provide under Mechanical Divisions but not limited to:
 - .1 Interlocking of supply or exhaust air fans
 - .2 Wiring for Automatic Controls
 - .3 Individual fan shut-down due to fire stat, freeze stat, duct smoke detector, etc.
- .6 Wiring, motors, control devices and electrical equipment provided under Mechanical Divisions shall conform to the Canadian Electrical Code as amended to date.
- .7 Wiring methods and standards shall conform with those specified in Electrical Division 26 for the area of the building in which the installation is to be made.
- .8 Install wiring in conduit unless otherwise noted.
- .9 Use thin wall conduit up to and including 32 mm size for wiring in ceilings, furred spaces, in hollow walls and partitions and where not exposed to mechanical injury. Use rigid galvanized steel conduit for wiring in poured concrete, where exposed and for conduit 38 mm size and larger. Plastic conduit is not acceptable above ground.
- .10 Run conduit and cables in finished areas concealed above ceilings and in partitions. Run conduit and cable exposed in any unfinished areas such as mechanical rooms, rooms with no suspended ceilings,

service tunnels and penthouses and install at right angles or parallel to building lines. Boxes shall be cast type.

- .11 Wiring shall be RW-90 X-Link type sized to carry 125% of the full load running current in accordance with the Electrical Code. Wiring shall be minimum No. 12 gauge, except for control wiring which shall be colour coded No. 14 gauge.

3.10 Manufacturer's Instructions

- .1 Where the specifications call for an installation to be made in accordance with Manufacturer's recommendations, a copy of such recommendations shall be at all times be kept on the job site and be available to the Owner's Representative.
- .2 Follow manufacturer's instructions where they cover points now specifically indicated on the drawings and specifications. If they are in conflict with the drawings and specifications obtain clarification from the Consultant before starting work.

3.11 Labels and Signs

- .1 Manufacturers' nameplates and CSA labels are to be visible and legible after equipment is installed. Provide warning signs, as specified, or to meet requirements of Inspection Department, Health and Safety, and the Engineer.
- .2 Label power outlets with circuit identification on visible portion of faceplate or surface mounted outlet box.

3.12 Tests and Acceptance

- .1 The operation of the equipment and electrical system does not constitute an acceptance of the work by the Owner. The final acceptance is to be made after the Contractor has adjusted his equipment and demonstrated that it fulfills the requirements of the drawings and the specifications.
- .2 Testing of all systems shall be performed in the presence of the Owner's designated representative. The contractor shall give 72 hours advance notice to the Owner before beginning the tests.
- .3 Upon completion of the installation, the Contractor shall furnish certificates of approval from all authorities having jurisdiction, as applicable. Contractor shall demonstrate that work is complete and in perfect operating condition, with raceway and conduit systems properly grounded, wiring free from grounds, shorts, and that the entire installation is free for any physical defects. In the presence of the Owner, the Contractor shall demonstrate the proper operation of all miscellaneous systems.

End of Section

1 General

1.01 Section Includes

- .1 Piping, equipment, and valve identification for fire suppression systems.
- .2 Fire suppression related signage.

1.02 Related Requirements

- .1 Section 23 05 53 – Identification for HVAC Piping and Equipment: comply with all requirements of that Section as related to the work results of this section, including general requirements, products, and execution.

1.03 References

- .1 CAN/CGSB-24.3-92 – Identification of Piping Systems.

1.04 Submittals

- .1 Submit under provisions of Division 01.
- .2 Shop Drawings: Submit list of wording, symbols, letter size, and color coding for fire suppression equipment, piping, and valve identification.
 - .1 Equipment Label Schedule: Provide a schedule of all equipment to be labeled with the proposed content for each label.
 - .2 Access Panel and Door Markers: Provide a schedule of all panels and doors to be labeled with the proposed content for each label.
 - .3 Pipe Label Schedule: Provide a schedule of each piping systems indicating a proposed nomenclature and location of all pipe markers.
 - .4 Valve Tag Schedule: Provide a proposed valve numbering scheme and schedule for each piping system. Tabulate valve number, piping system, system abbreviation as shown on tag, room or space location of valve, normal-operating position (open, closed, or modulating), and variations for identification. Mark valves intended for emergency shut-off and similar special uses.
 - .5 Warning Tags: Provide a schedule of all equipment to be labeled with the proposed content for each label.
- .3 Closeout Submittals: Record actual as built locations of valve tags and update schedules accordingly.

2 Products

2.01 Pipe Labels

- .1 As per ANSI/ASME A13.1.

2.02 Valve Tags

- .1 Valve tags consisting of engraved phenolic (lamacoid) sheets, having pre-drilled or stamped holes for attachment hardware, with Fire Department red background, white letters. Securely fasten tags to the pipe in the immediate vicinity of the valve identified.

2.03 Warning Signs

- .1 Material: Reprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.
- .2 Size: 3 by 5-1/4 inches minimum.
- .3 Fasteners: Brass grommet and wire.
- .4 Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
- .5 Colour: Yellow background with black lettering.

3 Execution

3.01 Installation

- .1 In addition to the piping, equipment and systems listed in Section 23 05 53, provide identification on all fire suppression piping, valves and equipment including the following:
 - .1 Fire suppression standpipes.
 - .2 Fire suppression wet sprinkler systems.
 - .3 Fire suppression dry sprinkler systems.
 - .4 Piping with heat tracing cables.
- .2 Identification of all fire suppression systems must comply with the requirements of the applicable NFPA standard where the requirements of that standard exceed these specifications.
- .3 Provide ceiling tacks to locate valves above lay-in suspended ceilings. Locate in corner or panel closet to equipment.

3.02 Valve Tags

- .1 Provide for each control valve, each shut-off valve, each drain valve, and each test valve. Provide a similar sign for each flow switch and pressure switch. Size of sign 150 mm by 15 mm, for automatic control valves and alarm valves and 50 mm by 150 mm for other valves.
- .2 Identification font height to be minimum 20 mm.
- .3 Coordinate valve numbers with the fire alarm annunciator panel as described in Division 28.

3.03 Field Painting

- .1 Clean, pre-treat, prime, and paint new systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories.
- .2 Apply coatings to clean, dry surfaces, using clean brushes.
- .3 Clean surfaces to remove dust, dirt, rust, and loose mill scale.
- .4 Immediately after cleaning, provide metal surfaces with one coat of pre-treatment primer applied to minimum dry film thickness of 0.3 mil, and one coat of zinc chromate primer applied to minimum dry film thickness of 1.0 mil.
- .5 Shield sprinkler heads with protective covering while painting is in progress.
- .6 Upon completion of painting, remove protective covering from sprinkler heads.
- .7 Remove sprinkler heads which have been painted and replace with new sprinkler heads.
- .8 Provide primed surfaces with following:
 - .1 Piping in Finished Areas:
 - .1 Provide primed surfaces with 2 coats of paint to match adjacent surfaces.
 - .2 Provide valves and operating accessories with 1 coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil.
 - .3 Provide piping with 50 mm wide red enamel bands self-adhering red plastic bands spaced at maximum of 6 m intervals throughout piping systems.
 - .2 Piping in Unfinished Areas:
 - .1 Provide primed surfaces with one coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil in attic spaces, spaces above suspended ceilings, crawl spaces, pipe chases, mechanical equipment room, and spaces where walls or ceiling are not painted or not constructed of a prefinished material.
 - .2 Provide piping with 50 mm wide red enamel bands self-adhering red plastic bands spaced at maximum of 6 m intervals.

3.04 Signs

- .1 Permanently fix hydraulic design data nameplates to riser of each system.
- .2 Install valve chart, framed under glass at location of main fire suppression piping riser.

End of Section

1 General

1.01 Section Includes

- .1 Sprinkler system.
- .2 Sprinkler system piping.
- .3 System design, installation, and certification.

1.02 References

- .1 NFPA 13 – Standard for Installation of Sprinkler Systems.
- .2 FM - Factory Mutual Approval Guide.
- .3 NFPA 70 - National Electrical Code.
- .4 UL - Fire Resistance Directory.
- .5 UL 199 – Automatic Sprinklers for Fire-Protection Service.

1.03 System Description

- .1 System to provide coverage for the building areas shown on the drawings.
- .2 Provide system to NFPA 13 requirements.
- .3 Determine volume and pressure of incoming water supply from water flow test data.
- .4 Interface system with building fire system.

1.04 Submittals for Review

- .1 Product Data: Provide data on sprinklers, valves, system assembly and specialties, including manufacturer’s catalogue information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- .2 Shop Drawings:
 - .1 Submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation.
 - .2 Submit hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components and accessories. Indicate system controls.
 - .3 Provide documented city pressure test. Include plan showing location and source of test. Test data must be not less than 45days prior to the start of the installation. Test methods per NFPA requirements and FM Global.

- .3 Submit shop drawings and hydraulic calculations to authority having jurisdiction for approval. Submit proof of approval to Consultant.

1.05 Submittals at Project Closeout

- .1 Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.
- .2 Manufacturer's Certificate: Certify that system has been tested and meets or exceeds code requirements.
- .3 Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- .4 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 Quality Assurance

- .1 Perform Work to NFPA 13.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- .3 Installer Qualifications: Company specializing in performing the work of this section with minimum three years' experience.
- .4 Design system under direct supervision of a Professional Engineer experienced in design of this Work and licensed in the Province of Ontario.

1.07 Regulatory Requirements

- .1 Conform to UL and FM.
- .2 Perform work to NFPA 13.
- .3 Equipment and components: bear UL and FM label or marking.
- .4 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc.

1.08 Delivery, Storage, and Protection

- .1 Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.09 Extra Materials

- .1 Operation and maintenance data.

- .2 Provide extra sprinklers to NFPA 13.
- .3 Provide suitable wrenches for each sprinkler type.

2 Products

2.01 Manufacturers

- .1 Grinnell.
- .2 The Reliable Automatic Sprinkler Co., Inc.
- .3 Viking.

2.02 Sprinklers Heads

- .1 Quick response, with 5 mm bulb, ½” diameter orifice and with a 74 degree Celsius rating. Type of sprinkler heads refer to drawings.
- .2 Furnish a metal cabinet containing spare sprinkler heads. The quantity of spare sprinklers for each type shall be in accordance with NFPA requirements. Provide at least six spare sprinklers of each type and temperature rating. The cabinet shall meet NFPA requirements and be approved by authorities having jurisdiction, and include the necessary tools for replacing each type of head supplied.
- .3 The stock of spare sprinklers shall include all types and ratings installed and shall be as follows:
 - (1) For protected facilities having under 300 sprinklers—no fewer than six sprinklers.
 - (2) For protected facilities having 300 to 1000 sprinklers —no fewer than 12 sprinklers.
 - (3) For protected facilities having over 1000 sprinklers — no fewer than 24 sprinklers.
- .4 Sprinkler heads, where provided in the proximity of unit heaters, shall be installed in accordance with figure 8.3.2.5 NFPA13.

2.03 Backflow Preventers

- .1 Double-Check Backflow-Prevention Assemblies:
 - .1 Standard: ASSE 1015.
 - .2 Operation: Continuous-pressure applications, unless otherwise indicated.
 - .3 Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
 - .4 End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
 - .5 Accessories:

- .1 Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
- .2 Manufacturers:
 - .1 Wilkins model 350ADA series (basis of design).
 - .2 Febco.
 - .3 Watts.
 - .4 Approved equal.

2.04 Piping

- .1 All piping shall be black steel pipe schedule 40.
- .2 Provide dielectric connections for piping of different conductivity.
- .3 Alternative pipe materials shall be submitted for the Engineer and Owner for approval.

3 Execution

3.01 Installation

- .1 Install to NFPA 13.
- .2 Install equipment to manufacturer's instructions.
- .3 Place pipe runs to minimize obstruction to other work.
- .4 Coordinate work with the other trades.
- .5 Provide and install test connection, where required, complete with globe valve and 25 mm drain pipe terminating with 13 mm diameter brass outlet located not more than 1.2 m above grade. Globe valves shall be located not more than 2.1 m above floor.
- .6 Provide auxiliary drains with 25 mm valves for the sections of piping that cannot be drained via the main drain.
- .7 Flush entire piping system of foreign matter.
- .8 Install guards on sprinklers where indicated.
- .9 Hydrostatically test entire system.
- .10 Require test be witnessed by authority having jurisdiction.

3.02 Interface with Other Products

- .1 Ensure required devices are installed and connected as required to fire alarm system.

3.03 Operating Instructions

- .1 Instruct Owner's designated representative in the operation, maintenance and care of the sprinkler system and supply to this representative two (2) copies of all available literature describing the installed equipment.

End of Section

1 General

1.01 Section Includes

- .1 Supply all labour, tools, services and equipment, and provide all materials and equipment required to complete the insulation work in accordance with this Section of the Specification and the drawings.
- .2 Insulation work shall include but not be limited to the following:
 - .1 Piping Insulation.

1.02 References

- .1 ASTM C195 – Mineral Fibre Thermal Insulating Cement.
- .2 ASTM C547 – Mineral Fibre Pipe Insulation
- .3 ASTM C552 – Cellular Glass Thermal Insulation
- .4 ASTM C578 – Rigid, Cellular Polystyrene Thermal Insulation.
- .5 ASTM C585 – Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
- .6 ASTM C921 – Properties of Jacketing Materials for Thermal Insulation.

1.03 Standards

- .1 Conform to the requirements of the ASHRAE/IES Standard 90.1.

1.04 Quality Assurance

- .1 Qualifications: Execute work of this Section only by skilled tradesmen regularly employed in the application of insulation of mechanical systems.
- .2 The word "exposed" where used in this Section means any work, which is not concealed in wall, shaft, or ceiling cavities or spaces. Work behind doors in closets or cupboards or under counters is considered exposed.

2 Products

2.01 Acceptable Manufacturers for Insulation Material

- .1 Fiberglass Canada.
- .2 Knauf Fibre Glass.
- .3 Johns Manville.
- .4 Manson Insulation Inc.

- .5 Approved equal.
- .6 Proto Corp. (For PVC Jacketing)
- .7 Sure-Fit Systems (For PVC Jacketing)

2.02 Basic Pipe Insulation (Pre-molded)

- .1 Provide sectional fibreglass pipe insulation in pre-molded section 900 mm (36") long, split and ready for application with a maximum "K" factor of 0.035 at 24oC mean temperature and be capable of use on service from -40oD to 260oC and with factory applied vapour seal jacket of vinyl coated foil craft laminate with reinforcing of open mesh glass fibre.
- .2 Provide jacket for exposed insulated pipe. Recovering jacket treated cotton fabric, ULC listed with lagging adhesive. PVC jacket, .015 mil, white in colour. Installation in accordance with manufacturer's solvent weld adhesive. Junctions between fittings and jacketing shall be sealed with white silicone.
- .3 Provide pre-molded fitting covers to suit insulated fitting.

2.03 Non Pre-molded Pipe Insulation

- .1 24kg/m3 (1.5lbs/ft3 20 mm (3/4") thick fibreglass flexible blanket with open mesh glass fibre reinforced aluminium foil face.

2.04 Rainwater Piping, Vent Piping

- .1 Insulate rainwater piping (A11), and vent piping (within 1.8 m of outlet) with 25 mm thick pre-molded insulation.
- .2 Insulate fittings for 100 mm and under, using glass fibre blanket to thickness equal to that of adjoining insulation.

2.05 Insulation of Piping Systems

- .1 Pipe Insulation
 - .1 Premoulded glass fibre insulation with factory applied vapour retarder self-seal jacket. Vapour retarder shall have a moisture resistance rating of not more than 0.02 perms when tested in accordance with ASTM E 96 Procedure A. Installation shall be in accordance with manufacturer's recommendations.
- .2 Jacket
 - .1 Exposed: Recovering jacket (9 oz.) treated cotton fabric, ULC Listed with lagging adhesive. Installation shall be in accordance with standard industry practices. PVC jacket (0.015 mil) shall be white in colour unless otherwise stipulated by Design Engineer. Installation shall be in accordance with manufacturer's solvent weld adhesive. Junctions between fittings and jacketing shall be sealed with white silicone with the bead formed in a convex shape.

.3 Fitting Covers

- .1 Premoulded to suit insulated fitting. Colour shall match jacket colour.

.4 Adhesive

- .1 Refer to manufacturer's recommendation for each specific application.

.5 Insulation of Fittings

- .1 Pipe sizes of 100 mm and under shall be insulated by wrapping glass fibre blanket, equal in thickness to that of the adjoining insulation. Pipe sizes over 100 mm shall be insulated with either premoulded or mitred glass fibre sections equal in thickness to that of the adjoining sections. The vapour retarder shall remain continuous over the insulation.

2.06 Drainage Systems

.1 Insulate pipe and fittings carrying:

- .1 Rainwater piping (All) - 25 mm thick.
- .2 Vent piping (within 1.8 m of outlet) - 25 mm thick.
- .3 Horizontal drain piping receiving condensate - 25 mm thick.

.2 Insulation of Fittings

- .3 100 mm and under shall be wrapped with glass fibre blanket to thickness equal to that of adjoining insulation.

2.07 Barrier-Free Accessible Fixtures

- .1 Insulate pipe and fittings carrying waste, cold and hot water exposed below all barrier-free accessible plumbing fixtures.

- .2 On water and waste piping and trap below each Handicapped lavatory: insulate with 13 mm Armaflex II or Acwil "Therma-Cel" flexible foamed elastomeric insulation. Paint insulation with two coats of "White Finish".

.3 Pipe Insulation

- .1 12 mm thick closed cell elastomeric thermal insulation with white covering (pre-moulded).
- .2 25 mm thick glass fibre insulation and covered with pre-formed PVC plastic jacket (white).

2.08 Hot and Cold Piping Systems

- .1 Insulate pipe, fittings, valves and strainers carrying:

- .1 Hot Water Heating (excluding inside cabinet)

- .2 Domestic Hot Water
- .3 Domestic Hot Water Recirculating Line
- .4 Tempered Water Line
- .5 Domestic Cold Water
- .2 Piping exposed to outdoors shall be covered with 22 ga aluminium cladding. Caulk all joints to provide a weatherproof and waterproof seal.
- .3 Insulation thicknesses shall be in accordance with ASHRAE 90.1 minimum requirements as per the following based on the nominal pipe diameter:
 - .1 Domestic Hot Water
 - .1 Less than 25 mm ϕ – 19 mm thick insulation.
 - .2 25 mm to less than 38 mm ϕ – 19 mm thick insulation.
 - .3 38 mm to less than 100 mm ϕ – 25 mm thick insulation.
 - .4 100 mm to less than 200 mm ϕ – 25 mm thick insulation.
 - .5 200 mm ϕ and greater – 25 mm thick insulation.
 - .6 Conductivity range is 0.22 – 0.28 BTU-in/h sq ft °F.
 - .2 Domestic Cold Water
 - .1 Less than 25 mm ϕ – 19 mm thick insulation.
 - .2 25 mm to less than 38 mm ϕ – 19 mm thick insulation.
 - .3 38 mm to less than 100 mm ϕ – 25 mm thick insulation.
 - .4 100 mm to less than 200 mm ϕ – 25 mm thick insulation.
 - .5 200 mm ϕ and greater – 25 mm thick insulation.
 - .6 Conductivity range is 0.22 – 0.28 BTU-in/h sq ft °F.

2.09 Fibreglass Equipment Insulation

- .1 Insulate:
 - .1 Roof Drain bodies: 25 mm thick
 - .2 Water meter: 25 mm thick
- .2 Insulate with fibreglass blanket type insulation, of the thickness noted.

- .3 Wrap the insulation as required to fit the shape and contour of the equipment. Secure the insulation in place with adhesive, and with steel or aluminum straps on 18" (450 mm) centres.
- .4 Point all open mitres, scores, joints and gaps with insulating cement. Cover the insulation with wire mesh secured to the metal bands. Lace edges of the wire mesh together. Apply a 1/4" (6 mm) thick skim coat of insulating cement, then, when the insulating cement has dried, apply a 1/4" (6 mm) thick finishing coat of cement trowelled smooth.

2.10 Finishes

- .1 170 g/m² (6 oz/yd²) canvas over insulated items where exposed indoors.
- .2 28 ga. aluminium over all insulated piping exposed to outdoors.
- .3 Weatherproof mastic, two coats trowelled smooth, over ductwork insulation where exposed outdoors.
- .4 Adhesive, sealants and finishes: Fire retardant or fire resistant when dry, and acceptable to Authorities having jurisdiction.

3 Execution

3.01 Installation

- .1 Ensure that pipe, fittings and equipment are dry and clean before applying insulation.
- .2 Do not apply insulation until the item to be covered has been leak tested.
- .3 Apply insulation in a neat workmanlike manner so that finished job is uniform in diameter and smooth in finish. Locate longitudinal seams so as to be invisible.
- .4 Insulation finish shall be designated "CONCEALED" where mechanical services (i.e. pipe, ducts, etc.) are installed in trenches, chases, furred spaces, pipe and ducts shafts, hung ceilings or raised floors.
- .5 Insulation finish designated "EXPOSED" will mean "NOT CONCEALED" as defined herein.
- .6 Mitre insulation at pipe elbow and wrap joint with adhesive tape. Where pipe is not to be recovered, cover joints with glass fabric reinforcing cloth pasted on and extending each side of joint throat for a distance equal to one covering diameter.
- .7 Insulation having a vapour barrier jacket shall be continuous where it passes through walls or floors. Protect exposed pipe insulation at floor line with 18 ga galvanized steel jacket approximately 100 mm high, secured to floor slab.
- .8 Tightly pack annular space between sleeve and pipe covering with insulation and fireproof vapour barrier where insulated pipes pass through sleeved openings in walls or floors. Packing shall extend full length of sleeve, and be finished flush at each end with caulking compound, aluminum colour.

- .9 Bands shall be 12 mm wide stainless steel or aluminum alloy straps with cadmium plated mechanical fasteners.
- .10 Where applicator proposes to use material other than those specified as acceptable, submit to the Consultant a complete list of such materials, indicating thickness of material for each individual service and the finishing procedures and materials proposed before installation.
- .11 Rigid insulation shall be applied with edges tightly butted
- .12 Do not insulate over equipment nameplates and identification tags. Locate field applied nameplates and identification tags on outside surface of insulation. Where nameplates are permanently fixed to equipment ensure insulation is applied around nameplate allowing for clearly legible nameplates.

3.02 Piping

- .1 Apply insulation at temperature of approximately 18 degrees C over clean, dry surfaces. Butt adjoining sections of insulation firmly together with the longitudinal seam of the jacket located on the bottom half of the pipe.
- .2 Insulate and finish in the same manner and same thickness as piping, all valves, fittings and flanges on hot and chilled water piping. Use PVC jacketed mitred sections of the specified pipe covering or preformed insulation to suit fittings.
- .3 Seal longitudinal lap joints with suitable vapour barrier adhesive for cold water piping and suitable cement capable of withstanding service temperature on hot water piping. Cover circumferential butt joints with a strip of the same materials as the jacket and cement as indicated above. Cover all joints with foil faced adhesive tape on chilled and cold water piping.
- .4 Concealed insulated items require no further finish than provided in factory applied jacket. Cover exposed insulation and all insulated equipment with canvas, field applied, adhered and lap sealed and finished off by a brush coat of approved sizing.
- .5 Insulated piping exposed to outdoors: Apply aluminium sheet securely over insulation. Pop rivet all joints. Use mitred sections at 'T' and 4 piece bands at elbows. Seal all joints and rivet points with approved sealants.
- .6 Seal valves, fittings and flanges on cold water application in a manner as specified for circumferential joints. On strainers, insulate over blow-down valves and bushings or flanges required for strainer basket removal by providing a removable prefabricated Armaflex cover held in place with a stainless steel gear clamp. Do not insulate over blow-down valves and bushings or flanges for strainer basket removed on hot water and condenser water piping.
- .7 Seal end joints and perforation with factory furnished 100 mm (4") vapour barrier strips applied with the same adhesives and cements as previously specified for cold and chilled water.

- .8 On all domestic cold water piping where oversized hangers are used: Protect insulation with a sheet metal saddle installed over the vapour barrier. For piping 40 mm (1 1/2") and larger provide a section of rigid insulation or non-compressible material under the vapour barrier the same length as the saddle.
- .9 Apply non preformed fibreglass flexible foil faced blanket on piping using an approved adhesive and seal all longitudinal and transverse joints with foil faced tape. Insulate pipe hanger in similar manner.

3.03 Application Schedule (Piping)

- .1 Piping: Provide piping insulation as follows:

Item	Insulation Thickness and Type
Domestic hot water	25 mm (1") pre-molded
Domestic hot water recirc.	25 mm (1") pre-molded
Domestic cold water	12 mm (1/2") pre-molded
Condensate drain	12 mm (1/2") pre-molded
Heating water supply/return	38 mm (1 1/2") pre-molded
Rainwater piping	25 mm (1") pre-molded

End of Section

1 General

1.01 Section Includes

- .1 Domestic cold water (DCW), domestic hot water (DHW) piping, and hot water recirculation piping.

1.02 References

- .1 ASME B31.9 – Building Services Piping.
- .2 Ontario Building Code – Latest Edition.

1.03 Submittals for Review

- .1 Refer to Division 01.
- .2 Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.

1.04 Submittals at Project Closeout

- .1 Refer to Division 01.
- .2 Project Record Documents: Record actual locations of valves.

1.05 Quality Assurance

- .1 Perform Work to Province of Ontario and municipal standards. Maintain one copy on site.
- .2 Welding Materials and Procedures: Conform to ASME SEC IX and applicable provincial labour regulations.
- .3 Welders Certification: To ASME.
- .4 Identify pipe with marking including size, ASTM material classification.

1.06 Regulatory Requirements

- .1 Perform Work to Ontario Plumbing Code.
- .2 Conform to Ontario code for installation of backflow prevention devices.
- .3 Provide certificate of compliance from municipality indicating approval of installation of backflow prevention devices.

1.07 Delivery, Storage, and Handling

- .1 Refer to Division 01.
- .2 Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

- .3 Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.08 Environmental Requirements

- .1 Refer to Division 01.
- .2 Do not install underground piping when bedding is wet or frozen.

1.09 Extra Materials

- .1 Refer to Division 01.
- .2 Provide two repacking kits for each size valve.

2 Products

2.01 Water Piping

- .1 Copper Tubing: ASTM B88, Type L hard drawn, silver brazing alloy solder for fittings.

2.02 Water Piping, Above Grade

- .1 Copper Tubing: ASTM B88, Type L. hard drawn.
 - .1 Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - .2 Joints: ASTM B32, solder, Grade 95TA.
- .2 Steel Pipe: ASTM A53 Schedule 40, hot-dipped galvanized.
 - .1 Fittings: Cast iron.
 - .2 Joints: Grooved mechanical couplings.
 - .3 Electrogalvanized is not acceptable.
- .3 CPVC Pipe: ASTM D2846, ASTM F441, or ASTM F442.
 - .1 Fittings: ASTM D2846, ASTM F437, ASTM F438, ASTM F439, or ASTM F441, CPVC.
 - .2 Joints: ASTM D2846, solvent weld with ASTM F493 solvent cement.
- .4 PVC Pipe: ASTM D1785 or ASTM D2241.
 - .1 Fittings: ASTM D2665, PVC.
 - .2 Joints: ASTM D2846, solvent weld with ASTM F493 solvent cement.
- .5 PB Pipe: ASTM D3309.

- .1 Fittings: ASTM F845, or copper.
- .2 Joints: Mechanical with copper compression rings.
- .6 Polyethylene/Aluminum Composition Tubing: ASTM F1281 or ASTM 1282.
 - .1 Fittings and Joints: Brass compression type.

2.03 Flanges, Unions, and Couplings

- .1 Pipe Size 80 mm (3 inches) and under:
 - .1 Ferrous pipe: Class 150 malleable iron threaded unions.
 - .2 Copper tube and pipe: Class 150 bronze unions with soldered joints.
- .2 Pipe Size Over 25 mm (1 inch):
 - .1 Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
 - .2 Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- .3 Grooved and Shouldered Pipe End Couplings:
 - .1 Housing: Malleable iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
 - .2 Sealing gasket: "C" shape composition sealing gasket.
- .4 Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
- .5 Unburied domestic cold water piping inside the building up to and including 100 mm size and domestic hot water piping on all sizes shall be Type "L" hard drawn copper tubing with cast bronze or wrought copper solder type fittings. Do not connect copper piping directly to ferrous material including tanks or piping. When making such connections use unions or flange connections, similar to Epco Di-Electric pipe fittings. Extruded brass fittings will not be accepted.
- .6 Water piping in mechanical equipment rooms shall be copper. Install disconnecting flanges of same material at tanks and pumps. Use wrought copper streamlined fittings, with silver brazing alloy solder for fittings and valves, on hot water lines within 7.5 m of hot water tank, if hot water supply main is copper.
- .7 Underground water piping, up to 75 mm size, shall be Type "K" and "L" soft drawn copper tubing with wrought copper solder type fittings using silver brazing alloy.

3 Execution

3.01 Examination

- .1 Verify existing conditions before starting work.
- .2 Verify that excavations are to required grade, dry, and not over-excavated.

3.02 Preparation

- .1 Ream pipe and tube ends. Remove burrs.
- .2 Remove scale and dirt, on inside and outside, before assembly.
- .3 Prepare piping connections to equipment with flanges or unions.

3.03 Cold Water Distribution

- .1 General arrangement of cold water piping from service entrance shall be as shown. Provide valved connections from the metered header to fixtures, hose bibbs and other equipment requiring cold water connections.
- .2 Provide a backflow preventer downstream of the water meter as required by Code.

3.04 Hot Water Distribution

- .1 Extend hot water piping from tanks, as indicated, and connect to fixtures, hose bibbs and other miscellaneous equipment requiring hot water connection throughout the building.

3.05 Recirculation Piping

- .1 Connect ends of hot water risers to recirculation mains, as indicated and continue these mains back to recirculating pump, making connections to each pump as shown. Arrange recirculation piping to provide continuous and positive circulation of hot water and tempered water throughout systems at all times.

3.06 Installation

- .1 Install to manufacturer's instructions.
- .2 Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- .3 Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- .4 Install piping to maintain headroom, conserve space, and not interfere with use of space.
- .5 Group piping whenever practical at common elevations.
- .6 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

- .7 Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 23 07 19.
- .8 Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Division 08.
- .9 Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- .10 Provide support for utility meters to requirements of utility companies.
- .11 Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Refer to Division 09.
- .12 Install valves with stems upright or horizontal, not inverted.
- .13 Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- .14 Install water piping to ASME B31.9.
- .15 Sleeve pipes passing through partitions, walls and floors.
- .16 Inserts:
 - .1 Provide inserts for placement in concrete formwork.
 - .2 Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - .3 Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 100 mm (4 inches).
 - .4 Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- .17 Where hot and cold water supply pipes connect to a combination supply fitting with a shut-off valve on its discharge, or the combination supply fitting is equipped with manual or thermostatic mixing valve, equip each hot and cold water supply pipe with a composition disc swing check valve ahead of the supply fitting.

3.07 Application

- .1 Install unions downstream of valves and at equipment or apparatus connections.
- .2 Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- .3 Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- .4 Provide flow controls in water recirculating systems where indicated.

3.08 Service Connections

- .1 Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- .1 Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

End of Section

1 General

1.01 Section Includes

- .1 Testing, adjustment, and balancing of air and hydronic systems.
- .2 Measurement of final operating condition of HVAC systems.

1.02 References

- .1 AABC - National Standards for Total System Balance.
- .2 ADC - Test Code for Grilles, Registers, and Diffusers.
- .3 NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
- .4 SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

1.03 Submittals

- .1 Submit to Division 01.
- .2 Submit name of adjusting and balancing to Owner for approval within 30 days after award of Contract.
- .3 Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- .4 Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
- .5 Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Consultant and for inclusion in operating and maintenance manuals.
- .6 Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
- .7 Include detailed procedures, agenda, sample report forms prior to commencing system balance.
- .8 Test Reports: Indicate data on NEBB formats.

1.04 Quality Assurance

- .1 Perform total system balance to ASHRAE 111 and NEBB Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
- .2 TAB firms shall be AABC/NEBB certified.

1.05 Sequencing

- .1 Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.

2 Products – Not Used

3 Execution

3.01 Examination

- .1 Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - .1 Systems are started and operating in a safe and normal condition.
 - .2 Temperature control systems are installed complete and operable.
 - .3 Proper thermal overload protection is in place for electrical equipment.
 - .4 Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - .5 Duct systems are clean of debris.
 - .6 Fire and volume dampers are in place and open.
 - .7 Air coil fins are cleaned and combed.
 - .8 Access doors are closed and duct end caps are in place.
 - .9 Air outlets are installed and connected.
 - .10 Duct system leakage is minimized.
- .2 Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
- .3 Beginning of work means acceptance of existing conditions.

3.02 Preparation

- .1 Provide instruments required for testing, adjusting, and balancing operations.
- .2 Provide additional balancing devices as required.

3.03 Installation Tolerances

- .1 Air Handling Systems: Adjust to within plus or minus 5 per cent of design for supply systems and plus or minus 10 per cent of design for return and exhaust systems.

- .2 Air Outlets and Inlets: Adjust total to within plus 5 per cent and minus 5 per cent of design to space. Adjust outlets and inlets in space to within plus or minus 10 per cent of design.

3.04 Adjusting

- .1 Ensure recorded data represents actual measured or observed conditions.
- .2 Permanently mark settings of dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- .3 After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- .4 Leave systems in proper working order, closing access doors, and restoring thermostats to specified settings.
- .5 At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- .6 Check and adjust systems approximately six months after final acceptance, and submit report.

3.05 Air System Procedure

- .1 Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.
- .2 Make air quantity measurements in ducts by pitot tube traverse of entire cross sectional area of duct.
- .3 Measure air quantities at air inlets and outlets.
- .4 Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- .5 Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- .6 Vary branch air quantities by damper regulation.
- .7 Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- .8 Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 per cent loading of filters.
- .9 Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

3.06 Air Balancing and Testing

- .1 Provide the services of an independent firm, acceptable to the Owner to undertake the work as follows:

- .1 Submit names of air balancing companies and obtain approval from the Owner prior to commencing of work.
- .2 Provide personnel for the purpose of reviewing working drawings, making site visits, preparing reports and taking responsibility for ensuring all air supply, exhaust, return and transfer distribution systems operate in accordance with specified requirements with tolerance of plus or minus 10 per cent.
- .3 Review and check working drawings to ensure that modifications, if required, are implemented prior to the execution of the work.
- .4 Provide inspections during the course of construction and issue reports making whatever recommendations are necessary in the interest of ensuring good air balance.
- .5 When the work is adequately completed, inspect, check and test all air systems. Also co-operate with controls systems.
- .6 After inspection and tests, identify all required sheaves, belts, adjustments, and ductwork modifications etc.
- .7 After deficient items have been rectified retest and issue a final report and certificate covering the following:
 - .1 Specified (a total of all outlets) and achieved total air quantities for new packaged rooftop units with supporting schematic diagrams showing test points.
 - .2 Specified and achieved individual air quantities per outlet, and terminal units, with supporting schematic diagrams showing test points.
 - .3 Nameplate and actual motor loading in amperes at actual voltage and installed overload heater size and manufacturer for new packaged units and new fan powered terminal units.
 - .4 Specified and actual fan total static pressures with breakdown showing inlet and discharge pressures for terminal units, and packaged units.
 - .5 Set minimum primary airflow for terminal units to 20 per cent.
 - .6 Noise and vibration - ensure that there is no excessive air and equipment noise and vibration transmitted into the occupied spaces. The desired noise level within the occupied space is NC25.
- .8 Unless noted otherwise, initially adjust the fresh air dampers for AC units to 20 per cent open.
- .9 Review the operation of complete air handling systems after a month and after 12 months in operation, and make necessary adjustment to the air supply systems, including through the ducts, diffusers, and grilles, and ensure that systems are properly balanced to provide optimum operating efficiency and comfort level.

3.07 Schedules

- .1 Equipment requiring testing, adjusting and balancing:
 - .1 Terminal Unit.
 - .2 Air Inlets and Outlets.
- .2 Report Forms:
 - .1 Title Page:
 - .1 Name of Testing, Adjusting, and Balancing Owner.
 - .2 Address of Testing, Adjusting, and Balancing Owner.
 - .3 Telephone number of Testing, Adjusting, and Balancing Owner.
 - .4 Project Name.
 - .5 Project Location.
 - .6 Project Engineer.
 - .7 Project Contractor.
 - .8 Report Date.
 - .2 Summary Comments:
 - .1 Design Versus Final Performance.
 - .2 Notable Characteristics of System.
 - .3 Description of Systems Operation Sequence.
 - .4 Nomenclature Used Throughout Report.
 - .5 Test Conditions.
 - .3 Instrument List:
 - .1 Instrument.
 - .2 Manufacturer.
 - .3 Model Number.
 - .4 Serial Number.
 - .5 Range.

- .6 Calibration Date.
- .4 Electric Motors:
 - .1 Manufacturer.
 - .2 Model/Frame.
 - .3 HP/BHP.
 - .4 Phase, Voltage, Amperage; Nameplate, Actual, No Load.
 - .5 RPM.
 - .6 Service Factor.
 - .7 Starter Size, Rating, Heater Elements.
 - .8 Sheave Make/Size/Bore.
- .5 V-Belt Drive:
 - .1 Identification/Location.
 - .2 Required Driven RPM.
 - .3 Driven Sheave, Diameter and RPM.
 - .4 Belt, Size and Quantity.
 - .5 Motor Sheave Diameter and RPM.
 - .6 Centre-to-Centre Distance, Maximum, Minimum, and Actual.
- .6 Air Moving Equipment:
 - .1 Location.
 - .2 Manufacturer.
 - .3 Model Number.
 - .4 Serial Number.
 - .5 Arrangement/Class/Discharge.
 - .6 Air Flow, Specified and Actual.
 - .7 Return Air Flow, Specified and Actual.
 - .8 Outside Air Flow, Specified and Actual.

- .9 Total Static Pressure (Total External), Specified and Actual.
- .10 Inlet Pressure.
- .11 Discharge Pressure.
- .12 Sheave Make/Size/Bore.
- .13 Number of Belts/Make/Size.
- .14 Fan RPM.
- .7 Exhaust Fan Data:
 - .1 Location.
 - .2 Manufacturer.
 - .3 Model Number.
 - .4 Serial Number.
 - .5 Air Flow, Specified and Actual.
 - .6 Total Static Pressure (Total External), Specified and Actual.
 - .7 Inlet Pressure.
 - .8 Discharge Pressure.
 - .9 Sheave Make/Size/Bore.
 - .10 Number of Belts/Make/Size.
 - .11 Fan RPM.
- .8 Air Distribution Test Sheet:
 - .1 Air Terminal Number.
 - .2 Room Number/Location.
 - .3 Terminal Type.
 - .4 Terminal Size.
 - .5 Area Factor.
 - .6 Design Velocity.
 - .7 Design Air Flow.

- .8 Test (Final) Velocity.
- .9 Test (Final) Air Flow.
- .10 Per cent of Design Air Flow.

3.08 Mechanical System Performance and Acceptance Tests

- .1 Prior to the operating tests specified hereinafter, forward to the Consultant a letter stating that the mechanical systems are complete in all respects, have been checked and tested, and are ready for start-up. When the letter has been received, the Consultant will visit the site for the purpose of witnessing a performance test of the heating, ventilation and air conditioning systems.
- .2 Include for all required labour for the performance tests and any adjustments required due to the results of the tests, and ensure that competent and qualified equipment manufacturer's representatives are present during such tests.
- .3 When the heating, ventilation and air conditioning systems are ready for acceptance, but before acceptance of same, subject the entire system to a continuous run for the length of time required for the purpose of demonstrating that all apparatus, materials, and systems are in perfect working order, that all controls and operating services are properly adjusted, that all units are heating and/or cooling properly, and that the systems provide uniform temperatures inside the building regardless of the outside temperatures or conditions. Make the tests under the direction of the Consultant, and if the system is not in proper operating condition, the Owner reserves the right, if all defects are not properly rectified, to employ other parties to make the necessary alterations and put the systems in proper working order, at this Contractor's expense.

End of Section

1 General

1.01 Section Includes

- .1 Supply all labour, tools, services and equipment, and provide all materials and equipment required to complete the insulation work in accordance with this Section of the Specification and the drawings.
- .2 Insulation work shall include but not be limited to the following:
 - .1 Duct work insulation.
 - .2 Duct Liner.
 - .3 Insulation jackets.

1.02 Related Requirements

- .1 Section 23 31 00 – HVAC Ducts and Casings.
- .2 Section 23 33 00 – Air Duct Accessories.

1.03 References AND STANDARDS

- .1 ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate.
- .2 ASTM C518 – Steady-State Thermal Transmission Properties by Means of the Heat Flow Metre Apparatus.
- .3 ASTM C553 – Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
- .4 ASTM C612 – Standard Specification for Mineral Fibre Block and Board Thermal Insulation.
- .5 ASTM C921 – Properties of Jacketing Materials for Thermal Insulation.
- .6 ASTM C1071 – Fibrous Glass Duct Lining Insulation(Thermal Sound Absorbing Material).
- .7 ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- .8 ASTM E96 – Water Vapour Transmission of Materials.
- .9 ASTM E162 – Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
- .10 ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- .11 NAIMA National Insulation Standards.
- .12 NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.
- .13 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

.14 UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

.15 ASHRAE/IES Standard 90.1

1.04 Submittals for Review

.1 Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 Submittals for Information

.1 Manufacturer's Instructions: Indicate installation procedures which ensure acceptable workmanship and installation standards will be achieved.

1.06 Quality Assurance

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years' experience.

.2 Applicator Qualifications: Company specializing in performing the work of this section with minimum three years' experience.

.3 Qualifications: Execute work of this Section only by skilled tradesmen regularly employed in the application of insulation of mechanical systems.

.4 The word "exposed" where used in this Section means any work, which is not concealed in wall, shaft, or ceiling cavities or spaces. Work behind doors in closets or cupboards or under counters is considered exposed.

1.07 Regulatory Requirements

.1 Materials: Flame spread/smoke developed rating of 25/50 to NFPA 255.

1.08 Delivery, Storage, and Handling

.1 Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

.2 Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.09 Environmental Requirements

.1 Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

.2 Maintain temperature during and after installation for minimum period of 24 hours.

2 Products

2.01 DUCTWORK

- .1 Exposed rectangular or round ductwork: 25 mm (1") thick 72 kg/m³ (4.5 lbs/ft³) density foil faced fibreglass board.
- .2 Concealed ductwork: 25 mm (1") thick 16 kg/m³ (1 lb/ft³) density foil faced open mesh glass fibre reinforced fibreglass blanket.
- .3 Ductwork exposed to outdoors: 2 layers of 25 mm (1") thick 72 kg/m³ (4.5 lbs/ft³) density foil faced fibreglass board. Provide one layer of 25mm (1") thick insulation where duct is internally acoustically lined.

2.02 FINISHES

- .1 170 g/m² (6 oz./yd²) canvas over insulated items where exposed indoors.
- .2 28 ga. aluminium over all insulated piping exposed to outdoors
- .3 Weatherproof mastic, two coats trowelled smooth, over ductwork insulation where exposed outdoors.
- .4 Adhesive, sealants and finishes: Fire retardant or fire resistant when dry, and acceptable to Authorities having jurisdiction.

2.03 ACCEPTABLE MANUFACTURERS FOR INSULATION MATERIAL

- .1 Fiberglass Canada.
- .2 Knauf Fibre Glass.
- .3 Johns Manville.
- .4 Manson Insulation Inc.
- .5 Proto Corp. (For PVC Jacketing)
- .6 Sure-Fit Systems (For PVC Jacketing)

3 Execution

3.01 Examination

- .1 Verify that duct work has been tested before applying insulation materials.
- .2 Verify that surfaces are clean, foreign material removed, and dry.

3.02 Installation

- .1 Division 01 - Quality Control.

- .2 Install to NAIMA National Insulation Standards.
- .3 Insulated duct work conveying air below ambient temperature:
 - .1 Provide insulation with vapour barrier jackets.
 - .2 Finish with tape and vapour barrier jacket.
 - .3 Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 - .4 Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- .4 Provide insulation on complete ducts on minimum 1.8 meters (8 feet) long on supply, return and exhaust air ducts connected to outdoor, and on ductwork as indicated on drawings.
- .5 Exposed rectangular ductwork: Impale fibreglass board on weld pins and speed washer 300 mm (12") o.c. with a minimum of two rows per side on any side greater than 300 mm (12"). Cut pins flush with surface of insulation and cover pin with foil faced tape. Cover all joints with foil faced self-adhesive tape.
- .6 Exposed round ductwork: Score and mitre fibreglass board to fit contours of duct and secure with 12 mm x 0.38 mm (1/2" x 0.015") galvanized steel bands 300 mm (12") o.c. Point up all joints with insulating cement and seal with foil faced self-adhesive tape.
- .7 Concealed ductwork: Apply flexible blanket insulation with an approved adhesive brushed on in 100 mm (4") wide strips 300 mm (12") o.c. and at all joints. Seal all joints and perforations with foil faced self-adhesive tape.
- .8 Ductwork exposed to outdoors: Impale fibreglass board on weld pins and speed washers 300 mm (12") o.c. with a minimum of two rows per side on any side greater than 300 mm (12"). Cut pins flush with surface of insulation and cover pins and joints with foil faced self-adhesive tape. Finish with two applications of weatherproof mastic trowelled smooth.
- .9 Duct Work Exposed in Mechanical Equipment Rooms or Finished Spaces below 10 feet above finished floor: Finish with canvas jacket sized for finish painting.
- .10 All new supply air ducts shall be insulated.

End of Section

1 General

1.01 Section Includes

- .1 Metal duct work.

1.02 Related Requirements

- .1 Section 23 33 00 – Air Duct Accessories.
- .2 Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

1.03 References

- .1 ASTM A90/A90M - Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
- .2 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- .3 NFPA 90B - Installation of Warm Air Heating and Air-Conditioning Systems.
- .4 SMACNA - HVAC Air Duct Leakage Test Manual.
- .5 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- .6 UL 181 - Factory-Made Air Ducts and Connectors.

1.04 Performance Requirements

- .1 No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts to ASHRAE table of equivalent rectangular and round ducts.

1.05 Submittals

- .1 In accordance with Division 01.
- .2 Product Data: Provide data for duct materials, duct liner, duct connectors.
- .3 Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.

1.06 Project Record Documents

- .1 Refer to Division 01, and Section 23 05 93.
- .2 Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.07 Quality Assurance

- .1 Perform Work to SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

- .2 Maintain one copy of document on site.

1.08 Regulatory Requirements

- .1 Construct duct work to SMACNA and all applicable NFPA standards.

1.09 Environmental Requirements

- .1 Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- .2 Maintain temperatures during and after installation of duct sealants.

2 Products

2.01 Manufactured Duct Work and Fittings

- .1 Manufactured to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- .2 Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- .3 Hanger Rod: ASTM A36; steel, hot-dipped galvanized; threaded both ends, threaded one end, or continuously threaded.

2.02 Galvanized Steel Ducts

- .1 ASTM A653 galvanized steel sheet, lock-forming quality, having G60 zinc coating to ASTM A90.

2.03 Flexible Ducts

- .1 Flexible ducts manufactured from a continuous strip of spirally wound 3003 corrugated aluminum, mechanically interlocked to produce an air-tight and leak proof triple seam.
- .2 Basis of Design: Commercial (Bare) True Flex – Model TF by Peppertree Air Solutions Inc.
- .3 Ratings and Classifications:
 - .1 ULC-S110 listed as Class 1 air duct connector
 - .2 Flame Spread Rating of not over 25.
 - .3 Smoke Developed Rating of not over 50.
 - .4 Pressure Rating: 1000 Pa (4 inches WG) positive and 175 Pa (0.5 inches WG) negative.
 - .5 Maximum Velocity: 20.3 m/sec 4000 fpm.
 - .6 Temperature Range: -28 to 79 degrees C (-20 to 175 degrees F).

- .4 Install as one continuous piece.
- .5 Maximum length not to exceed 1.8 m (6 feet).

3 Execution

3.01 Duct Work Fabrication

- .1 Fabricate and support to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- .2 Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centreline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fibre insulation.
- .3 Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- .4 Fabricate continuously welded round and oval duct fittings two gauges heavier than duct gauges indicated in SMACNA Standard. Joints: minimum 100 mm (4 inch) cemented slip joint, brazed or electric welded. Prime coat welded joints.
- .5 Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

3.02 Installation

- .1 Install to manufacturer's instructions.
- .2 Install and seal ducts to SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- .3 Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- .4 Provide openings in duct work where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated duct work, install insulation material inside a metal ring.
- .5 Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- .6 Use double nuts and lock washers on threaded rod supports.
- .7 Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- .8 During construction provide temporary closures of metal or taped polyethylene on open duct work to prevent construction dust from entering duct work system.

3.03 Cleaning

- .1 Clean work in accordance with Division 01.
- .2 Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.
- .3 Clean duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into duct work for cleaning purposes.

3.04 Balancing

- .1 In accordance with Section 23 05 93.

End of Section

1 General

1.01 Section Includes

- .1 Dampers:
 - .1 Backdraft dampers.
 - .2 Fire dampers.
 - .3 Volume control dampers.
- .2 Duct access doors.
- .3 Duct test holes.
- .4 Flexible duct connections.
- .5 Turning vanes and extractors.
- .6 Duct silencers.

1.02 Related Requirements

- .1 Section 23 31 00 – HVAC Ducts and Casings.
- .2 Section 23 37 00 – Air Outlets and Inlets.

1.03 References

- .1 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- .2 NFPA 92A - Smoke-Control Systems.
- .3 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- .4 UL 33 - Heat Responsive Links for Fire-Protection Service.
- .5 ULC S112 - Fire Dampers.
- .6 AMCA 210 – Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

1.04 Submittals

- .1 Refer to Division 01.
- .2 Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors and duct test holes.

- .3 Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes and hardware used. Include electrical characteristics and connection requirements.
- .4 Manufacturer's Installation Instructions: Indicate for fire dampers and combination fire and smoke dampers.

1.05 Project Record Documents

- .1 Refer to Division 01.
- .2 Record actual locations of access doors.

1.06 Regulatory Requirements

- .1 Products Requiring Electrical Connection: Listed and classified by Canadian Standards Association, or testing firm acceptable to the Authority Having Jurisdiction as suitable for the purpose specified and indicated.

1.07 Delivery, Storage, and Handling

- .1 Refer to Division 01.
- .2 Protect dampers from damage to operating linkages and blades.

2 Products

2.01 Air Turning Devices/Extractors

- .1 Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.
- .2 Manufacturers
 - .1 Duro Dyne Corp.
 - .2 Ductmate Industries.
 - .3 Equivalent approved by Engineer.

2.02 Duct Access Doors

- .1 Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- .2 Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated duct work, install minimum 25 mm (one inch) thick insulation with sheet metal cover.
 - .1 Less Than 300 mm (12 inches) Square: Secure with sash locks.

- .2 Up to 450 mm (18 inches) Square: Provide two hinges and two sash locks.
- .3 Up to 600 by 1200 mm (24 by 48 inches): Three hinges and two compression latches with outside and inside handles.
- .4 Larger Sizes: Provide an additional hinge.
- .3 Access doors with sheet metal screw fasteners are not acceptable.
- .4 Manufacturers:
 - .1 Ruskin.
 - .2 Nailor.
 - .3 Ductmate Industries.
 - .4 Equivalent approved by Engineer.

2.03 Duct Test Holes

- .1 Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- .2 Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.04 Fire Dampers

- .1 Fabricate to NFPA 90A and ULC S112, and as indicated.
- .2 Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations closure under air flow conditions. Configure with blades out of air stream except for 250 Pa (1.0 inch) pressure class ducts up to 300 mm (12 inches) in height.
- .3 Fusible Links: UL 33, separate at 100 degrees C with adjustable link straps for combination fire/balancing dampers.

2.05 Flexible Duct Connections

- .1 Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- .2 Connector: Fabric crimped into metal edging strip.
 - .1 Fabric: ULC listed fire-retardant neoprene coated woven glass fibre fabric to NFPA 90A, minimum density 1.0 kg/sq m.
 - .2 Net Fabric Width: Approximately 150 mm wide.
 - .3 Metal: 75 mm wide, 0.6 mm thick galvanized steel.

- .3 Leaded Vinyl Sheet: Minimum 14 mm thick, 4.2 kg/sq m, 10 dB attenuation in 10 to 10,000 Hz range.

2.06 Volume Control Dampers

- .1 Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- .2 Splitter Dampers:
 - .1 Material: Same gauge as duct to 600 mm size in either direction, and two gauges heavier for sizes over 600 mm.
 - .2 Blade: Fabricate of double thickness sheet metal to streamline shape, secured with continuous hinge or rod.
 - .3 Operator: Minimum 6 mm diameter rod in self-aligning, universal joint action, flanged bushing with set screw.
- .3 Butterfly Dampers
 - .1 Butterfly dampers shall be constructed of 16 gauge steel. Sizes up to 300 mm wide and 760 mm long shall be of standard louvre blade construction. Larger size ducts use standard size multi-blade louvre dampers with a minimum of 150 mm blade.
- .4 Manual Dampers
 - .1 Manual dampers shall be lockable in place with damper quadrant. Damper rod end to be marked indicating blade position.

2.07 Motorized Dampers

- .1 Manufacturers:
 - .1 E.H. Price, Model SCD-LL-57 for rectangular and Model SCD-RD-LL88 for round duct.
 - .2 Nailor.
 - .3 Ruskin.
 - .4 Metalaire
 - .5 Substitutions: Equivalent must be approved by Engineer.
- .2 Motorized dampers shall be galvanized steel construction, low-leakage parallel blade type. Damper shall be provided with a two-position, direct coupled, spring return electric actuator with two SPDT auxiliary switches. Actuator shall be manufactured by Belimo, 120 volt, with adequate torque for damper size.

3 Execution

3.01 Preparation

- .1 Verify that electric power is available and of the correct characteristics.

3.02 Installation

- .1 Install accessories to manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 00 for duct construction and pressure class.
- .2 Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- .3 Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust duct work to NFPA 96. Provide minimum 200 mm by 200 mm size for hand access, 450 mm by 450 mm size for shoulder access, and as indicated. Provide 100 mm by 100 mm for balancing dampers only. Review locations prior to fabrication.
- .4 Provide duct test holes where indicated and required for testing and balancing purposes.
- .5 Provide fire dampers, combination fire and smoke dampers and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- .6 Install smoke dampers and combination smoke and fire dampers to NFPA 92A.
- .7 Demonstrate re-setting of fire dampers to Owner's representative.
- .8 Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment, and supported by vibration isolators.
- .9 Use splitter dampers only where indicated.
- .10 Provide balancing dampers on systems where indicated.
- .11 Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

End of Section

1 General

1.01 Section Includes

- .1 Devices used to supply or remove air from a space or building.
 - .1 Diffusers, Registers, and Grilles.
 - .2 Louvres.

1.02 Related Requirements

- .1 Section 23 31 00 – HVAC Ducts and Casings.

1.03 References

- .1 NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- .2 NFPA 92A - Smoke-Control Systems.
- .3 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- .4 UL 33 - Heat Responsive Links for Fire-Protection Service.
- .5 UL 555 - Fire Dampers.
- .6 AMCA 210 – Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

1.04 Submittals

- .1 Refer to Division 01.

1.05 Project Record Documents

- .1 Refer to Division 01.

1.06 Delivery, Storage, and Handling

- .1 Refer to Division 01.
- .2 Protect dampers from damage to operating linkages and blades.

2 Products

2.01 Diffusers, Registers, and Grilles

- .1 Manufacturers:
 - .1 EH Price Industries
 - .2 Metalaire.

- .3 Nailor.
- .4 Substitutions: Equivalent must be approved by Engineer.
- .2 Accessories
 - .1 Provide all grilles, registers, and diffusers complete with accessories as detailed on the drawings.
 - .2 For t-bar lay in ceilings the grilles, registers, and diffusers shall lay into t-bar system and no flange shall extend beyond flange of T-Bar.
 - .3 See schedule on drawings for manufacturer and model.
- .3 Linear Slot Diffusers
 - .1 Price Industries SDS Series, Supply Diffuser
 - .1 Furnish and install Price model SDS (50, 75, 100, 150) supply diffusers of the sizes, configurations and mounting types indicated on the plans and outlet schedule. Diffusers shall have (1 - 10) discharge slots (1/2 in., 3/4 in., 1 in., 1 1/2 in.) wide with aerodynamically curved “ice tong” shaped pattern controllers for 180 degree air pattern control and air flow dampering if required. The diffuser border shall be heavy extruded aluminum construction with extruded aluminum spacers and mitered end flanges, open ends, flush end caps or angle end caps. Continuous length units shall be provided with factory assembled corner modules to suit drawings and on site conditions. Joiner strips shall be provided to align continuous slot assemblies. The diffuser border shall be finished in B12 White Powder Coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.
 - .2 Price Industries SDB Series, Accessory Plenums
 - .1 SDS linear slot diffuser shall be provided with Price model SDA, SDAI, SDB, SDBI plenum assembly of the sizes, configurations and mounting types indicated on the plans and outlet schedule. Plenums shall be constructed of zinc coated steel and have 1/4 in. internal insulation (models SDAI and SDBI). Plenum assembly shall have sloped shoulders for enhanced spread characteristics (SDA and SDAI only). Plenum assemblies shall be of a side inlet configuration with sizes to fit SDS of 1 to 4 slots.
- .4 Return Grille
 - .1 Price Industries Return Grille, Eggcrate Face 80
 - .1 Furnish and install Price model 80 return grilles of the sizes and mounting types indicated on the plans and outlet schedule. Grilles shall be of aluminum construction, consisting of aluminum 1/2 in. x 1/2 in. x 1/2 in. (13 x 13 x 13) grid (eggcrate core) and an extruded aluminum border. The grille shall be finished in (B12 White Powder Coat / B15 Aluminum Powder Coat). Paint finish shall pass 500 hours of salt spray exposure

with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

- .2 Price Industries Return Grille, Louvered Face 630
 - .1 Furnish and install Price model 630 aluminum return grilles of the sizes and mounting types indicated on the plans and outlet schedule. Grilles shall be 45 degree deflection fixed louver type with blades spaced 3/4 in. (19) on center. The blades shall run parallel to the (long / short) dimension of the grille. The grille shall be finished in (B12 White Powder Coat / B15 Aluminum Powder Coat). Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

- .5 Square Ceiling Diffusers
 - .1 Price Industries SCD
 - .1 Square Cone Diffuser, Fixed Air Pattern (3 and 4 Cone)
 - .2 Furnish and install Price model, SCD AS aluminized steel, ceiling diffusers of sizes and mounting types designated by the plans and air distribution schedule. Diffusers shall consist of a precision formed back cone of one-piece seamless construction that incorporates a round inlet collar of sufficient length for connecting rigid or flexible duct. The diffuser shall integrate with all duct sizes shown on the plans without affecting the face size and appearance of the unit. An inner cone assembly shall consist of 3 cones (or optional 4 cones) which drop below the ceiling plane to assure optimal VAV air diffusion performance. The inner cone assembly shall be completely removable from the diffuser face to allow for full access to any dampers or other ductwork components located near the diffuser neck. Finish shall be B12 white powder coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

- .6 Drainable Louver
 - .1 Price Industries (DE635)
 - .1 Furnish and install PRICE Model DE635 Drainable Louver of size and shape indicated on the plans and/or as described in schedules. Louvers shall be constructed entirely of extruded aluminum, alloy 6063-T5. Blades and frames shall be minimum 0.081" (2.06mm) wall thickness. Louver assemblies shall be 6" (152.4mm) deep with 35-degree stationary drainable blades.
 - .2 Louver performance shall be based on tests and procedures in accordance with AMCA publication 511 and comply with the requirements of the AMCA Certified Rating Program.

- .3 Louvers shall be designed to withstand a 25 psf (100 mph wind equivalent) wind load. Each louver shall be fitted with 1/2" (12.7mm) mesh x 0.063" (1.60mm) diameter aluminum bird screen. Bird screen shall be expanded aluminum construction and suitable for exterior mounting.
- .4 Louvers shall be supplied with a standard mill finish. If an optional finish is required, please select one of the following:
 - .1 Louvers shall be factory primed and finished-after-assembly with a baked enamel resin coating in a colour selected from the colour chart. Primer and resin coating shall be oven baked at 450°F in accordance with the coating manufacturer's instructions. •
 - .2 Louvers shall receive a Class 2 (clear) anodize finish complying with AAMA 61198. Finish is applied to chemically etched and pretreated aluminum to a minimum thickness of 0.4 - 0.7 mil. •
 - .3 Louvers shall receive a Class 1 (colour) anodize finish complying with AAMA 61198. Finish is applied to chemically etched and pretreated aluminum to a minimum thickness of 0.7 - 1.0 mil. Colour shall be Price (match the architect's requirements).
 - .4 Each louver shall be fitted with required mesh size: 1/2" (12.7mm) mesh x 0.063" (1.60mm) diameter aluminum bird screen in non-rewirable U-shaped frames for permanently securing screen mesh. Bird screen shall be expanded aluminum construction and suitable for exterior mounting.
 - .5 Louvers shall be welded construction.
 - .6 Louvers shall be supplied with a flanged frame.
 - .7 Louvers shall be supplied with continuous blade section to give the appearance of invisible mullions.
 - .8 Each louver shall be fitted with an insulated aluminum blank-off panel.

3 Execution

3.01 Installation

- .1 Install accessories to manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 00 for duct construction and pressure class.
- .2 Install devices in accordance with manufacturer's recommendations and related sections.

- .3 Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

End of Section

1 General

1.01 Section Includes

- .1 Common requirements for electrical work.
- .2 Mounting heights for electrical equipment and devices.

1.02 Related Requirements

- .1 Provisions of this section apply to all sections of Division 26.
- .2 Section 07 84 00 – Firestopping.
- .3 This section is to be read in conjunction with Division 00 documents, and Division 01 specification sections, which take precedence as described in CCDC 2-2008.
 - .1 General Conditions.
 - .2 Supplementary General Conditions.
 - .3 General Requirements.

1.03 Intent

- .1 Include all material, labour, equipment, and plant construction as necessary to make a complete installation as shown and specified hereinafter.
- .2 Leave complete systems ready for continuous and efficient satisfactory operation.
- .3 Discipline and Trade Jurisdiction
 - .1 In accordance with CCDC 2-2008 GC 1.1.7: Neither the organization of the Specifications nor the arrangement of Drawings shall control the Contractor in dividing the work among Subcontractors and Suppliers.
 - .2 MasterFormat's organizational structure used in a project manual does not imply how the work is assigned to various design disciplines, trades, or subcontractors. MasterFormat is not intended to determine which particular elements of the project manual are prepared by a particular discipline. Similarly, it is not intended to determine what particular work required by the project manual is the responsibility of a particular trade. A particular discipline or trade is likely to be responsible for subjects from multiple Divisions, as well as from multiple Subgroups.

1.04 Drawings and Specifications

- .1 The drawings and specifications are complementary each to the other and what is called for by one to be binding as if called for by both. Should any discrepancy appear between the drawings and specifications, which leaves the Contractor in doubt as to the true intent and meaning of plans and specifications, a

- ruling is to be obtained from the Consultant in writing before submitting Bid. If this is not done, the maximum, the most expensive alternate or option will be provided in base tender bid.
- .2 All drawings and all Divisions of these specifications shall be considered as a whole, and work of this Division shown anywhere therein shall be furnished under this Division.
 - .3 Drawings are diagrammatic and indicate the general arrangement of equipment and pathways. Most direct routing of conductors and wiring is not assured. Exact requirements are governed by architectural, structural, and mechanical conditions of the job. Consult all other drawings in preparation of the bid. Extra lengths of wiring or addition of pull and junction boxes, etc. necessitated by such conditions are to be included in the bid. Check all information and report and apparent discrepancies before submitting the bid.
 - .4 Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pathways so as to best fit the layout of the job.
 - .5 Scaling off the drawings will not be sufficient or accurate for determining these locations. Where job conditions require reasonable changes in indicated arrangement and locations, such changes shall be made at no additional cost to the Owner.
 - .6 Because of the scale of the drawings, certain basic items, such as junction boxes, pull boxes, conduit fittings, etc. may not be shown, but where such items are required by other sections of the specifications of where there are required for proper installation of the work, such items are to be furnished and installed.
 - .7 Before ordering any conduit, cable tray, conductors, wireways, raceway bus duct, fittings, etc., verify all pertinent dimensions at the job site and be responsible for their accuracy.
 - .8 If obvious ambiguities or omissions are noticed when tendering refer same to the Consultant for a ruling and obtain the ruling in writing in the form of an Addendum. Claims for extras for ambiguities or omission of items brought to the attention of the Consultant after the award of a contract which, due to the nature of the ambiguity or omission, should have been brought to the attention of the Consultant during the tendering period, will not be allowed.
 - .9 The drawings are performance drawings, diagrammatic, and show locations for apparatus and materials. The drawings are intended to convey the scope of work and do not intend to show Architectural and Structural details. The locations shown are approximate, and may be altered, when approved by the Consultant, to meet requirements of the material and/or apparatus, other equipment and systems being installed, and of the building. Do not scale drawings.
 - .10 Provide any fitting, offset, transformation, etc., required to suit architectural and structural details but not shown.

1.05 Work Restrictions

- .1 Refer to Section 01 14 00.

- .2 Existing buildings:
 - .1 Examine the existing building, the site and surrounding areas and be fully informed as to the conditions and limitations under which the work has to be executed. Claims for additional costs will not be entertained with respect to conditions which could reasonably be ascertained by an inspection prior to Tender closing.
 - .2 All work in the existing building, other than minor works required to permit construction of the new addition, is to be performed in such a manner as to not disrupt the building operations.
 - .3 All systems are to be kept in full operation during normal building hours.
 - .4 Note that any noise generating works that disrupt the building operation shall be coordinated accordingly and carried out after/before normal operating hours.
 - .5 Cut, modify, or extend as necessary or as directed by the Consultant, the existing material or equipment to be reused or relocated to suit work under this contract.
 - .6 Existing materials and equipment which are to be used in new work shall be repaired and refinished as necessary. Provide additional new materials and components as required to facilitate reinstallation of such existing materials and equipment.
 - .7 Co-ordinate with the Owner, and refer to General Conditions.
 - .8 Do work in existing areas to best suit available space and not interfere with or obstruct use of existing facilities.
 - .9 Where disruptions of existing services are required, coordinate shut down with the Owner's operating staff and do the work at a time and in a manner mutually acceptable. Carefully schedule disruptions to keep "down time" to a minimum.
- .3 Do all cutting, patching and making good to leave in a finished condition and to make the several parts of the Work come together properly. Co-ordinate work to keep cutting and patching to a minimum.
- .4 Quality of workmanship and materials used in patching, making good and refinishing of existing construction and/or compartments shall be of a standard equal to that specified for new construction and if not specified, equal to or exceeding that of original existing work.
- .5 Prior to cutting openings, examine wall, floor and ceiling construction for buried electrical cables and pipes; and take adequate protection. Conduct cable locating tests to locate buried cables in existing work.

1.06 Cash Allowances

- .1 Where applicable Cash allowances are to be carried as indicated in Section 01 21 00 for the items indicated, each including all equipment, wiring material, labour, incidentals, profit, overhead, taxes, etc.

- .2 Conduit and wireway rough-in for the above systems is part of this contract, and is excluded from the above allowances.

1.07 Substitution Procedures

- .1 Refer to Division 01 and General Provisions of the Contract.
- .2 Additionally, "Approved Equal" shall be defined as an alternate approved by the Consultant.
- .3 If during the tender bid process, the bidding contractor wishes to substitute the specified equipment for an "Approved Equal", the bidding contractor must submit shop drawings to the Consultant before the tender close for approval. If no substitution request is made, the as-specified equipment is that to be provided.
- .4 Where several manufacturers' names are given, the first named manufacturer constitutes the basis for job design and establishes the equipment quality required to be used in this contract.
- .5 This contractor, at his option, may use equipment as manufactured by the other manufacturers if listed. This contractor is responsible to ensure that all items submitted by these other manufacturers meets are requirements of the drawings and specification and fits in the allocated space. The final determination of a product being equivalent is to be determined by the Consultant when a catalog number is not listed, or listed in part.
- .6 Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Consultant as described in the General Provisions of the Contract for Submittals. The Contractor bears full responsibility for the unnamed manufacturers' equipment adequately meeting the intent of the design. The Owner or the Consultant may reject manufacture at time of shop drawing submittal.

1.08 Contract Modification Procedures

- .1 When submitting quotations in response to changes in the contract, quotations for electrical work are to include a breakdown of all material, including material unit rates, and labour units as indicated in the NECA Manual of Labor Units (MLU).

1.09 Coordination

- .1 Refer to Section 01 31 00.
- .2 Coordinate work with other trades to avoid conflict and to provide correct rough-in and connection for equipment furnished under other trades that require electrical connection. Inform Contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.
- .3 Verify equipment dimensions and requirements with provision specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work.

Changes or additions subject to additional compensation, which are made without written authorization and an agreed price, shall be at Contractor's risk and expense.

- .4 Read specifications and drawings of other trades and conform with their requirements before proceeding with any work specified in this Division related to other trades. Co-operate with all other trades on the job, so that all equipment can be satisfactorily installed, and so that no delay is caused to any other trades.
- .5 Coordinate utility service outages with the owner. Obtain permission from Owner at least 24 hours before partially or completely disabling system. Minimize outage duration.
- .6 Existing Fire Alarm System: Maintain existing system in service. Disable system only to make switch overs and connections. Notify Owner at least 24 hours before partially or completely disabling system. Minimize outage duration.
- .7 Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- .8 Co-ordinate work with all trades to ensure a proper and complete installation. Notify all trades concerned of the requirement for openings, sleeves, insets and other hardware necessary for the installation and, where work is to be integrated with the work of other trades or is to be installed in close proximity with the work of other trades, carefully co-ordinate the work prior to installation.
- .9 Working Detail Drawings
 - .1 The contractor is to prepare working detail drawings supplementary to the contract drawings, when deemed necessary by the Consultant, for all areas where a multiplicity of materials and or apparatus occur, or where the work due to architectural and structural considerations involves special study and treatment. Such drawings may be prepared jointly by all trades affected, or by the one trade most affected with due regard for and approval of the other trades, all as the Consultant will direct in each instance. Such drawings must be reviewed by the Consultant before the affected work is installed.
 - .2 Carry out all alterations in the arrangement of work which has been installed without proper study and approval, even if in accordance with the contract documents, in order to make such work come within the finished lines of walls, floors and ceilings, or to allow the installation of other work, without additional cost. In addition, make any alterations necessary in other work required by such alterations, without additional cost.

1.10 Submittal Procedures

- .1 Refer to Section 01 33 00.
- .2 Before delivery to site of any item of equipment, submit shop drawings complete with all data, pre-checked and stamped accordingly, for review by the Consultant. Indicate project name on each brochure or sheet, make reference to the number and title of the appropriate specification section, type identifier

such panelboard ID or luminaire type as indicated on appropriate schedule, and provide adequate space to accommodate the Consultant's review stamp(s).

- .3 Verify field measurements and affected adjacent Work are coordinated, including passageway clearances for movement of equipment into location.
- .4 Submit shop drawings to the Consultant in electronic (PDF) format, as coordinated after award of contract. Where submittals are derived from digital originals, do not print and rescan documents; submittals made as such will be immediately rejected.
- .5 Submit a schedule of shop drawings within one week after award of contract. Group submittals by specification division as appropriate.
- .6 Shop Drawings
 - .1 Submit for review, properly identified shop drawings showing in detail the design and construction of all equipment and materials as requested in sections of the specification governed by this Section.
 - .2 Obtain and comply with the manufacturer's installation instructions.
 - .3 Endorse each shop drawing copy "CERTIFIED TO BE IN ACCORDANCE WITH ALL REQUIREMENTS", stamp each copy with your company name, date each copy with the submittal date, and sign each copy. Shop drawings which are received and are not endorsed, dated and signed will be returned for re-submittal.
 - .4 The Consultant will stamp shop drawings as follows:
 - .1 Reviewed ()
 - .2 Reviewed as Modified ()
 - .3 Revise and Re-Submit ()
 - .4 Not Reviewed ()
 - .5 If "REVIEWED" is checked-off, the shop drawing is satisfactory. If "REVIEWED AS MODIFIED" is checked-off, the shop drawing is satisfactory subject to requirements of remarks put on shop drawing copies. If "REVISE AND RE-SUBMIT" is checked-off, the shop drawing is entirely unsatisfactory and must be revised in accordance with comments written on shop drawing copies and resubmitted. If "NOT REVIEWED" is checked-off, the shop drawing is in error of submission, not applicable for this project.
 - .6 This review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approved the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of 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 co-ordination of the work as well as compliance with codes and inspection authorities such as CSA, etc.

1.11 Safety Requirements

- .1 Be responsible for the safety of workers and the equipment on the project in accordance with all applicable safety legislation passed by Federal, Provincial, and local authorities governing construction safety. The more stringent regulations prevail.

1.12 Regulatory Requirements

- .1 Codes and Standards
 - .1 Ontario Electrical Safety Code c/w Bulletins and Amendments.
 - .2 Ontario Building Code and its referenced standards.
 - .3 Applicable CSA and ULC Standards.
 - .4 All work shall be in accordance with Owner's Design Guidelines.
- .2 Permits and Fees
 - .1 Obtain and pay for all permits and fees required for the execution and inspection of the electrical work and pay all charges incidental to such permits. Submit to Electrical Inspection Department and Supply authority necessary number of drawings and specifications for examination and approval prior to commencement of work. Arrange and pay for any special inspection of equipment specified if and when required.
 - .2 Apply, pay and obtain all permits as required for the electrical work.
 - .3 Upon substantial completion of your work, supply and turn over to the Consultant all required inspection certificates from governing authorities to certify that the work as installed conforms to the rules and regulations of the governing authorities.
- .3 Patents
 - .1 Pay all royalties and licence fees, and defend all suits or claims for infringement of any patent rights, and save the Owner, Architect, Project Manager and Consultants harmless of loss or annoyance on account of suit, or claims of any kind for violation or infringement of any letters patent or patent rights, by this Subcontractor or anyone directly or indirectly employed by him or by reason of the use by him or them of any part, machine, manufacture or composition of matter on the work, in violation or infringement or such letters patent or rights.

1.13 References

- .1 Canadian Standards Association

- .1 CSA-C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
- .2 CAN3-C235-83(R2006), Preferred Voltage Levels for AC Systems, 0 to 50 000 V.
- .3 Do underground systems in accordance with CSA C22.3 No.7-06, Underground Systems, except where specified otherwise.
- .4 Ontario Electrical Safety Code, 25th Edition / 2012.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
 - .1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Ontario Electrical Safety Code, 25th Edition / 2012, and all bulletins.
- .5 Hydro requirements and local applicable codes and regulations.
- .6 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.14 Definitions

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.15 Quality Assurance

- .1 The specifications contained herein are set forth as the minimum acceptable requirements. This does not relieve the Contractor from executing other quality assurance measures to obtain a complete operating system within the scope of this project.
- .2 Ensure that all workmanship, all materials employed, all required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.
- .3 Provide quality assurance tests and operational check on all components of the electrical distribution system, all lighting fixtures, and communication systems.
- .4 Only first class workmanship will be accepted, not only in regards to durability, efficiency and safety, but also in regards to neatness of detail. Present a neat and clean appearance on completion to the satisfaction of the Consultant. Any unsatisfactory workmanship will be replaced at no extra cost.
- .5 Conform to the best practices applicable to this type of work. Install all equipment and systems in accordance with the manufacturer's recommendations, but consistent with the General Requirements of

this specification. Electrical Contractor will be held responsible for all damage to the work of his own or any other trade, resulting from the execution of his work. Store all electrical equipment and materials in dry locations.

- .6 Provide foreman in charge of this work at all times.
- .7 The contractor shall be fully liable to provide and maintain in force during the life of this Contract, such insurance, including Public Liability Insurance, Product Liability Insurance, Auto Liability Insurance, Worker's Compensation, and Employer's Liability Insurance.
- .8 Governing Federal, Provincial and Municipal codes and regulations will be considered minimum standards for the work and where these are at variance with the drawings and specification, the more stringent ruling will apply.
- .9 Where any code, regulation, bylaw, or standard is quoted it shall mean the current edition including all revisions or amendments at the time of the tender.
- .10 In case of conflict, the codes and regulations take precedence over the Contract Documents. In no instance reduce the standard or scope of work or intent established by the drawings and specifications by applying any of the codes referred to herein.

1.16 Quality Control

- .1 Provide a full time Superintendent to oversee and coordinate all sub-trades in these divisions.

1.17 Temporary Utilities

- .1 Do not use any of the permanent facility systems during construction except as may be specified, or unless written approval is obtained from the Consultant or the owner.
- .2 The use of permanent facilities for temporary construction service will not affect in any way the commencement day of the warranty period.
- .3 Temporary heating during the construction period will be provided as described in Division 01.

1.18 Product Requirements

- .1 The design, manufacture and testing of electrical equipment and materials shall conform to or exceed the latest applicable CSA, IEEE, and ANSI standards.
- .2 All materials must be new and be ULC or CSA listed. Any materials not covered by the aforementioned listing standards shall be tested and approved by an independent testing laboratory, Technical Inspection Services, or other government agency.
- .3 Materials and equipment are specifically described and named in this Specification in order to establish a standard of material and workmanship.
- .4 Materials required for performance of work shall be new and the best of their respective kinds and of uniform pattern throughout work.

- .5 Materials shall be of Canadian manufacture where obtainable. Materials of foreign manufacture, unless specified, shall be approved before being used.
- .6 Equipment items shall be standard products of approved manufacture. Identical units of equipment shall be of same manufacture. In any unit of equipment, identical component parts shall be of same manufacture, but the various component parts comprising the unit need not be of one manufacture.
- .7 Chemical and physical properties of materials and design performance characteristics and methods of construction and installation of items of equipment, specified herein, shall be in accordance with latest issue of applicable Standards or Authorities when such are either mentioned herein, or have jurisdiction over such materials or items of equipment.
- .8 Materials shall bear approval labels as required by Code and/or Inspection Authorities.
- .9 Install materials in strict accordance with manufacturer's recommendations.
- .10 Include items of material and equipment not specifically noted on Drawings or mentioned in Specification but which are necessary to make a complete and operating installation.
- .11 Remove materials, condemned as not approved for use, from job site and deliver and install suitable approved materials in their place.
- .12 Unless otherwise noted, equipment and material specifications in Sections of the Specification governed by this Section are based on products of a manufacturer selected by the Consultant for the purpose of setting a standard of quality, size, performance, capacity, appearance and serviceability.
- .13 In most instances the names of acceptable manufacturers are also stated for materials and equipment, and you may base your tender price on equipment and materials produced by either the specified manufacturer or a manufacturer listed as acceptable.
- .14 For any items of equipment, material, or for any system where acceptable manufacturers are not stated, you must provide only the equipment, material or system specified.
- .15 If materials or equipment manufactured and/or supplied by a manufacturer named as acceptable are used in lieu of products of the manufacturer specified, be responsible for ensuring that the substituted material or equipment is equivalent in size, performance and operating characteristics to the specified materials or equipment, and it shall be understood that all costs for larger starters, additional space, larger power feeders, and changes to associated or adjacent work required as a result of providing materials and equipment named as acceptable in lieu of the specified product will be borne by Contractor.
- .16 In addition to the manufacturers specified or named as acceptable, the Contractor may propose alternative manufacturers of equipment and/or apparatus to the Consultant for acceptance, listing in each case a corresponding credit for each alternative proposed, however, the tender price must be based on apparatus or materials specified or named as acceptable. Certify in writing to the Consultant that the alternative meets all space, power, design, and all other required of the specified or equivalent material or apparatus. In addition, it shall be understood that all costs for larger starters, space, power

feeders, and changes to associated equipment, mechanical and/or electrical, required by acceptance of proposed alternatives, will be borne by the party making the proposal. Alternative equipment requiring greater than specified energy requirements or unduly limiting service space requirements will not be accepted.

- .17 Where a manufacturer is not listed for a particular product, it will be deemed to mean that the contractor will provide the specified manufacturer's product.

1.19 Examination and Preparation

- .1 Examine the existing equipment, the site and surrounding areas and be fully informed as to the conditions and limitations under which the work has to be executed. Claims for additional costs will not be entertained with respect to conditions which could reasonably have been ascertained by an inspection prior to Tender closing.
- .2 Examine work upon which your work depends. Report in writing defects in such work. Application of your work shall be deemed acceptance of work upon which your work depends.
- .3 Drawings are, in part, diagrammatic and are intended to convey scope of work and indicate general and approximate location, arrangement and sizes of equipment, piping, and similar items. Obtain more accurate information about locations, arrangement and sizes from study and coordination of drawings, including shop drawings and manufacturers' literature and become familiar with conditions and spaces affecting these matters before proceeding with work.
- .4 Where job conditions require reasonable changes in indicated locations and arrangements, make such changes with approval of the Consultant at no additional cost to the Owner. Similarly, where existing conditions interfere with new installation and require relocation, such relocation is included in work.

1.20 Cutting and Patching

- .1 The Electrical Contractor will be responsible for all cutting and patching required for the electrical installation. Structural members are not to be cut without the consent of the Consultant.
- .2 All cutting and patching required under Division 26, Division 27, and Division 28 shall be in accordance with Division 01. Layout such work for approval before undertaking same.
- .3 Cutting shall be kept to an absolute minimum and performed in a neat and workmanlike manner using the proper tools and equipment. Caution shall be exercised in all cutting and procedures to ensure that concealed services are not affected. Do not cut if in doubt. Request Consultant's presence to determine if concealed services exist.
- .4 Assume responsibility for prompt installation of Work in advance of concrete pouring or similar Work. Should any cutting or repairing of finished/unfinished Work be required because such installation was not done, employ the particular trade, whose Work is involved, to do such cutting and patching. Pay for any resulting costs. Layout such Work for approval before undertaking same.

1.21 Cleaning and Waste Management

- .1 The Contractor and associated sub trades, at all times during construction, to keep the site free of all debris, boxes, packing, etc., resulting from work of this trade. At the completion of this work, the electrical installation is to be left in a clean and finished condition to the satisfaction of the Consultant.
- .2 Clean and repair existing materials and equipment which remain or are to be reused.
- .3 Luminaires to be reinstalled: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.
- .4 Assume responsibility for removing tools and waste materials on completion of Work, and leave Work in clean and perfect condition.

1.22 Starting and Adjusting

- .1 Conduct acceptance tests to demonstrate that the equipment and systems actually meet the specified requirements. Tests may be conducted as soon as conditions permit, and consequently make all changes, adjustments, or replacements required as the preliminary tests may indicate prior to the final tests. Tests shall be as specified in various sections of this Division. Carry out tests in the presence of the Consultant. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project. The Electrical Contractor shall be in charge of the plant during tests. He shall assume responsibility for damages in the event of injury to the personnel, building, equipment, and shall bear all costs for liability, repairs, and restoration in this connection. Submit test results.
- .2 Make tests of equipment and wiring at times requested.
- .3 Tests shall include meggered insulation values, voltage and current readings to determine balance of panels and feeders under full load, and operation of each piece of equipment for correct operation.
- .4 Supply meters, materials and personnel as required to carry out these tests.
- .5 Test electrical work to standards and function of Specification and applicable codes in an approved manner. Replace defective equipment and wiring with new material and leave entire system in complete first class operating condition.
- .6 Connect single phase loads so that there is the least possible unbalance of the supply phases.
- .7 Submit all test results in report format.
- .8 Trial Usage
 - .1 The Consultant reserves the right to use any system, piece of equipment, device, or material for such reasonable lengths of time and at such times as may be required to make a complete and thorough test of the same, or for the purpose of learning operational procedures, before the final completion and acceptance of the work. Such tests shall not be construed as evidence of acceptance of the work, and it is agreed and understood that no claim for damage will be made

for injury or breakage to any part or parts of the above due to the aforementioned tests, where such injuries or breakage are caused by a weakness or inaccuracy of parts, or by defective materials or workmanship of any kind. Supply all labour and equipment required for such tests.

- .2 Perform and pay for all costs associated with any testing required on the system components where, in the opinion of the Consultant the equipment manufacturer's ratings or specified performance is not being achieved.

1.23 Closeout Procedures

- .1 The Consultant will carry out inspections and prepare deficiency list for action by the Contractor, during and on completion of project.
- .2 Furnish a Certificate of Acceptance from Inspection Department on completion of work.

1.24 Closeout Submittals

- .1 Project Record Documents
 - .1 Extra sets of white prints will be provided on which to make, as the job progresses, all approved changes and deviations from the original drawings. Complete Record Drawings accurately marked up in red ink must be submitted for approval before the contract is considered to be completed.
 - .2 Changes and deviations include those made by addenda, change orders, and supplemental instructions, and changes and deviations to be marked on the white print record drawings indicated on supplemental drawings issued with addenda, change orders, and supplemental instructions. Maintain the "as-built" white prints at the site for periodic inspection by the Consultant throughout the duration of the work.
 - .3 Upon substantial completion of the work, obtain a set of reproducible white prints of the drawings and neatly amend the print in accordance with the marked-up white prints to produce a true "as-built" set of drawings.
 - .4 As-built drawings are to indicate all circuiting as installed and all distribution junction box locations as well as conduit routes.
 - .5 Trace routing of existing panelboard feeders for all panelboards and indicate on as-built drawings.
 - .6 As-Built AutoCAD Drawings
 - .1 Submit completed Document 00 64 01 to the Consultant, and remit payment as indicated for release of Consultant's AutoCAD files.
 - .2 Transfer the information from the "as-built" white prints to the files, and submit to the Consultant for review.

- .3 Employ a competent computer draftsman to indicate changes on the electronic set of record drawings. Provide drawings in Adobe Acrobat 6.0, and AutoCAD release 2020.
- .4 Submit three (3) USB memory sticks of as-built drawings in AutoCAD format, one with each O&M manual.
- .5 Provide three (3) sets of full size as-built drawings in hard copy format, one with each O&M manual.
- .7 As-built Single Line Diagram:
 - .1 Provide in Main Electrical Room one wall mounted copy of as-built Single Line Diagram on 1/4 inch foam board.
 - .2 As-built Single Line Diagram to indicate manufacturer name and catalogue numbers of as-installed products.
- .2 Operations and Maintenance (O&M) Data
 - .1 Submit two complete sets of Operation and Maintenance instruction manuals in hard copy, and one in electronic format. Include in each copy of the manual:
 - .1 Verification certificates for installation of life safety systems by the manufacturer's representative.
 - .2 A copy of "reviewed" shop drawings.
 - .3 Complete explanation of operating principles and sequences.
 - .4 Recommended maintenance practices and precautions.
 - .5 Complete wiring and connection diagrams.
 - .6 Certificates of guarantees.
 - .2 Ensure that operating and maintenance instructions are specific and apply to the model and types of equipment provided.
- .3 Warranties
 - .1 Submit a written guarantee to the Owner for one year from the date of acceptance. This guarantee shall bind the contractor to correct, replace or repair promptly any defective equipment workmanship without cost to the Owner.
 - .2 All equipment, materials and workmanship shall be unconditionally guaranteed for a minimum period of one year from the date of acceptance.

- .3 Provide warranty certificates, wherever given or required, in excess of the normal warranty period showing the name of the firm giving the warranty, dated and acknowledged, on specific equipment and systems.
- .4 Warranties for temperature controls and building automation systems will start on the date of verification of acceptance by the Consultant.
- .5 Include these certificates with the maintenance and operating manuals in the appropriate sections.

1.25 Demonstration and Training

- .1 In the presence of the Owner, demonstrate the proper operation of all systems.
- .2 Instruct the Owner's designated representatives in all aspects of the operation and maintenance of systems and equipment listed in the trade sections governed by this Section. Obtain in writing from the Consultant a list of the Owner's representatives qualified to receive instructions.
- .3 Arrange for and pay for the services of qualified service technicians and other manufacturer's representatives required for instruction of specialized portions of the installation.

2 Products – Not Used

3 Execution

3.01 Demolition

- .1 Remove all electrical equipment and devices on redundant structures. Make safe all circuits, and provide continuity of remaining circuits.
- .2 To make safe: Withdraw redundant wiring and remove unwanted conduit/wiring and accessories. Position breakers to OFF position and update panel schedules.
- .3 Make safe any redundant mechanical devices as shown on mechanical drawings.
- .4 Maintain continuity of existing services for other circuits/devices serving areas outside the Work area. Provide additional wiring/conduits/boxes etc. to suit existing services to be maintained and also implement new Work as detailed.
- .5 Allow for this work in Tender Price.
- .6 Turn over designated equipment to the Owner. Dispose of unwanted materials and equipment.

3.02 Concrete Work

- .1 Provide all concrete work required for the electrical work. Reinstall surfacing as per architectural requirements.

- .2 Provide a 100 mm (4 inch) high concrete housekeeping pad for floor mounted electrical distribution equipment, such as the following:
 - .1 Transformers.
 - .2 Switchgear and switchboards.
 - .3 Distribution panelboards.
 - .4 Engine Generators.
 - .5 Uninterruptible Power Supplies and batteries.
 - .6 Transfer Switches.

3.03 Lintels

- .1 Lintels for openings in masonry shall conform with requirements of by-laws, and as approved by the Structural Engineer.
- .2 Pay all costs for lintels over openings, required solely by the electrical trades, not shown on architectural or structural drawings.

3.04 Metals

- .1 Steel construction required solely for the work of this trade, and not shown on architectural or structural drawings shall be provided by this Division to the requirements of Division 05.

3.05 Flashing and Sheet Metal

- .1 Flash all conduits and systems passing through roof or built into an outside wall, or a waterproof floor.
- .2 Provide copper flashing for sleeves passing through exterior walls or waterproof floors.

3.06 Firestopping

- .1 Provide firestopping in accordance with Section 07 84 00.
- .2 Ensure that fire ratings of floors and walls are maintained.
- .3 Provide ULC classified firestopping products by 3M or Hilti which have been tested in accordance with CAN4-S115.
- .4 Pack clearance spaces, fill all spaces between openings, pipes and ducts passing through fire separations and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.
- .5 Install firestopping systems using personnel trained or instructed by the product manufacturer.

3.07 Access Doors

- .1 Group conduit work to ensure the minimum number of access doors is required.
- .2 Access doors are to be installed by the trade responsible for the particular type of construction in which the doors are required.

3.08 Painting and Finishes

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .2 Repair and finish factory finished equipment, damaged or scratched during installation, in an approved manner.
- .3 All structural steel including hangers, brackets, supports and other ferrous metals shall be shop or factory prime painted wherever practicable. Wherever structural steel including hangers, brackets, supports, and other ferrous metals cannot be shop or factory prime painted, wire brush to remove all traces of rust, clean of all traces of dirt, oil, and grease, and apply one coat of an approved rust inhibiting primer in accordance with CGSB-GB-40d, and leave ready to receive finish paint.
- .4 Primary and final painting for Work, other than items specified as factory primed or finished, will be performed as described in Division 09 – Finishes.
- .5 All electrical fittings, supports, hanger rods, pull boxes, channel frames, conduit racks, outlet boxes, brackets, clamps etc., to have galvanized finish or paint finish over corrosion-resistant primer.
- .6 All panelboards, motor starters etc., to be factory finished with baked on enamel. All enamel to be baked on gloss over corrosion resistant primer.
- .7 Touch up minor damage to finish on factory finished equipment. Items suffering major damage to finish shall be replaced at the direction of the Consultant.
- .8 Protect work so that finishes will not be damaged or marred during construction. Maintain the necessary protection until completion of the work.
- .9 Provide all exposed ferrous metal work on equipment with at least one factory prime coat, or paint one prime coat on job. Clean up or wire brush all equipment, etc., before painting.
- .10 For factory applied finishes, repaint or refinish surfaces damaged during shipment, erection or construction work.

3.09 Location of Outlets

- .1 Refer to Architectural drawings for dimensions denoting exact locations. All locations shall be as per OESC requirements and OBC and where required by the owner.

- .2 The Consultant reserves the right to change the location of outlets to within 3 m from the point indicated on the plans without extra charge providing the Contractor is advised before installation is made.
- .3 Location of lighting, convenience, telephone, power and communication outlets shall be subject to change, without extra cost to Owners, provided information is given prior to installation. No extra amount will be paid for extra labour and materials for relocating outlets up to 3000 mm from their original location nor will credits be anticipated where relocation up to 3000 mm reduces materials and labour. Other cases will be considered on their individual merits.
- .4 Coordinate location of boxes with latest architectural drawings and instructions to suit door swings, millwork etc. prior to rough-in.

3.10 Mounting Heights and Device Locations

- .1 Refer to architectural drawings for exact location of electrical equipment and devices. Architectural drawings take precedence over electrical.
- .2 Architectural elevations take precedence over electrical elevations. If there are conflicts between architectural and electrical, adjust locations of electrical equipment at no additional cost to the owner.
- .3 Prior to roughing-in, the contractor is to mark locations of electrical equipment and devices for conflicts with architectural, studs, etc. If conflicts are noted, inform the consultant for a decision prior to commencing the rough-in.
- .4 Mounting heights of equipment and devices listed below is from finished floor to centreline of equipment, unless specified or indicated otherwise.
- .5 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .6 Install electrical equipment at following heights above finished floor (AFF). Dimensions are to centre of device unless indicated otherwise.
 - .1 Power door operator push buttons: 1000 mm.
 - .2 HVAC thermostats and manual HVAC controls: 1200 mm.
 - .3 Local switches, and manual lighting control devices:
 - .1 1100 mm.
 - .2 Locate on lock side of door.
 - .4 System furniture service fittings: to suit furniture layout.
 - .5 Wall receptacles:
 - .1 General: min. 400 mm AFF.

- .2 Above top of counters: 175 mm.
- .3 Above top of continuous baseboard heater, or mechanical heating/radiation units:
75 mm to bottom of device.
- .4 In fan rooms, mechanical rooms, and electrical rooms: 1100 mm.
- .6 Outlets in raceways or millwork to be located as per Architectural details.
- .7 Door bell pushbuttons: 1100 mm.
- .8 Panelboards: as indicated in Section 26 24 16.
- .9 Emergency lighting remote heads: 300 mm below finished ceiling, or 2400 mm AFF for exposed areas or areas with ceiling height above 2750 mm (9 feet).
- .10 Communications:
 - .1 Typical communication outlets (voice and data): 400 mm.
 - .2 Communications outlets for wall mounted telephones, intercom, or similar: 1100 mm.
 - .3 Television outlets: 200 mm below finished ceiling.
 - .4 Wall mounted public address speakers: 2100 mm.
 - .5 Clocks: 2100 mm.
- .11 Access control card readers and keypads: 900 mm.
- .12 Fire alarm manual pull stations: 1200 mm.
- .13 Wall mounted fire alarm audible devices, including bells or horns:
 - .1 2300 mm to the top of the device in areas of ceiling height 2450 mm or greater.
 - .2 150 mm below the finished ceiling for ceiling heights less than 2450 mm, measured to the top of the device.
- .14 Wall mounted fire alarm visible signal devices, including strobes: 2300 mm.
- .15 Fire Alarm emergency telephones: 1400 mm.

3.11 Manufacturer's Instructions

- .1 Where the specifications call for an installation to be made in accordance with Manufacturer's recommendations, a copy of such recommendations shall be at all times be kept on the job site and be available to the Owner's Representative.

- .2 Follow manufacturer's instructions where they cover points now specifically indicated on the drawings and specifications. If they are in conflict with the drawings and specifications obtain clarification from the Consultant before starting work.

3.12 Tests and Acceptance

- .1 The operation of the equipment and electrical system does not constitute an acceptance of the work by the Owner. The final acceptance is to be made after the Contractor has adjusted his equipment and demonstrated that it fulfills the requirements of the drawings and the specifications.
- .2 Testing of all systems shall be performed in the presence of the Owner's designated representative. The contractor shall give 72 hours advance notice to the Owner before beginning the tests.
- .3 Upon completion of the installation, the Contractor shall furnish certificates of approval from all authorities having jurisdiction, as applicable. Contractor shall demonstrate that work is complete and in perfect operating condition, with raceway and conduit systems properly grounded, wiring free from grounds, shorts, and that the entire installation is free for any physical defects.

End of Section

1 General

1.01 Section Includes

- .1 Building wire and cable.
 - .1 Armoured cable.
 - .2 Metal clad cable.
 - .3 Wiring connectors and connections.
- .2 Permitted voltage drop for feeder and branch circuits.

1.02 References

- .1 CSA C22.1 - Canadian Electrical Code, Part I, Safety Standard for Electrical Installations
- .2 Ontario Electrical Safety Code
- .3 CSA C22.2 No. 0.3 - Test Methods for Electrical Wires and Cables.
- .4 CSA C22.2 No. 48-M90 (R2000) - Non-metallic Sheathed Cable.
- .5 CSA C22.2 No. 51 Armoured Cables.
- .6 CSA C22.2 No. 52-96 (R2000) - Underground Service-Entrance Cables.
- .7 CAN/CSA C22.2 No. 65-03 (CSA/UL/ANCE) – Wire Connectors.
- .8 CSA C22.2 No. 75-03 (CSA/UL/ANCE) - Thermoplastic-Insulated Wires and Cables.
- .9 CSA C22.2 No. 123 Aluminum Sheathed Cables.
- .10 CSA C22.2 No. 131 Type TECK 90 Cable.
- .11 NECA (National Electrical Contractors Association) - Standard of Installation.
- .12 NETA (International Electrical Testing Association) - ATS-2003 - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- .13 CAN/ULC-S139-12 – Standard Method of Fire Test for Evaluation of Integrity of Electrical Power, Data and Optical Fibre Cables.

1.03 Coordination

- .1 Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

1.04 Qualifications

- .1 Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.

1.05 Regulatory Requirements

- .1 Conform to CSA C22.1.
- .2 Provide products listed and classified by CSA (Canadian Standards Association) as suitable for the purpose specified and indicated.

1.06 Site Conditions

- .1 Verify that field measurements are as indicated.
- .2 Conductor sizes are based on copper unless indicated as aluminum or "AL".
- .3 Wire and cable routing indicated is approximate unless dimensioned.

2 Products

2.01 Manufacturers

- .1 BICC Phillips.
- .2 General Cable.
- .3 Nexans.
- .4 Prysmian.
- .5 Southwire.

2.02 Building Wire

- .1 RW90:
 - .1 Single copper conductor.
 - .2 Minimum #12 AWG for branch circuit wiring.
 - .3 Minimum #14 AWG for 120V control wiring.
 - .4 Chemically cross-linked polyethylene insulation.
 - .5 Rated for 90 degrees C, 600V
 - .6 Suitable for handling to minus 40 degrees C.

- .7 For interior installations in conduit.
- .2 RWU90:
 - .1 Single copper conductor.
 - .2 Minimum 12 AWG for branch circuit wiring.
 - .3 Minimum 14 AWG for 120 V control wiring.
 - .4 Chemically cross-linked polyethylene insulation.
 - .5 Rated for 90 degrees C, 600 V
 - .6 Suitable for handling to minus 4 degrees C.
 - .7 For exterior installations in conduit.
- .3 T90 Nylon:
 - .1 Single copper conductor.
 - .2 Thin wall PVC insulation with nylon covering.
 - .3 Rated for 90 degrees C, 600V.
 - .4 May be used up to size 10 AWG for interior installations.
 - .5 Base conduit fill on RW90 cable diameters.

2.03 Armoured Cable

- .1 Description: Type AC.
- .2 Two, three or four copper conductors rated RW90, 1000 V.
- .3 Bare copper ground wire.
- .4 Insulation Voltage Rating: 600 volts.
- .5 Insulation Temperature Rating: 90 degrees C (194 degrees F).
- .6 Insulation Material: Thermoplastic.
- .7 Runs to be limited to fixture drops and in walls, maximum exposed run 1.5 m.
- .8 Do not daisy chain (leap frog) luminaires with armoured cable.

2.04 Mineral Insulated (MI) Cables

- .1 Pentair Pyrotenax 1850 series with 2 hour fire rating to ULC S139 and to meet Ontario Building Code Rule 3.2.7.10.
- .2 Alternates such as “Lifeline” installed in conduit may only be considered if listed by ULC under ULC Category Code ‘FHJRC’ after October 201
- .1 Acceptable alternate: VITALink MC Brand Type MC, manufactured by Marmon Wire & Cable Inc. (listed by ULC under ULC category code ‘FHJRC’, dated 19 May 2015).

2.05 TECK90 Cable

- .1 Single, three, or four conductors as indicated on drawings.
- .2 Cable to CAN/CSA-C22.2 No. 131.
- .3 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, size as indicated.
- .4 Insulation: Cross-linked polyethylene (XLPE), type RW90, rating: 600 V.
- .5 Inner jacket: polyvinyl chloride.
- .6 Armour: interlocking aluminum.
- .7 Overall covering: thermoplastic.
- .8 Fastenings:
 - .1 One-hole steel straps to secure surface cables 50 mm diameter and smaller. Two-hole steel straps for cables larger than 50 mm diameter.
 - .2 Channel type supports for two or more cables at 1500 mm centres.
 - .3 Threaded rods: 6 mm diameter to support suspended channels.
- .9 Connectors: Watertight, approved for TECK cable.

2.06 Wiring Termination

- .1 Lugs, terminals, or screws used for termination of wiring to be suitable for copper conductors. Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring. Maintain phase sequence and colour coding throughout.

- .2 Splice wire, up to and including No. 6 gauge, with nylon insulated expandable spring type connectors.
 - .1 Thomas & Betts – Marr Max Series
- .3 Splice large conductors using compression type connections insulated with heat shrink sleeves.
 - .1 Thomas & Betts – 5400 Series lugs & heat shrink type #s series

2.07 Conductors, Wires, and Cables

- .1 Indoor wiring installed in conduit, unless otherwise noted: 600 volt "RW90 XLPE".
- .2 Wiring in channel back of fluorescent lighting fixtures: 600 volt type GTF or TEW.
- .3 Lighting and power branch circuit wiring:
 - .1 Copper, minimum No. 12 gauge.
 - .2 Home runs to lighting and receptacle panels, which exceed 22 m (75 feet) in length: minimum No. 10 gauge.
- .4 Size wires for 2 per cent maximum voltage drop to farthest outlet on a maximum 80 per cent loaded circuit.
- .5 Outdoor wiring: "RWU90 XLPE".
- .6 Conductors shall be colour coded. Conductors No. 10 gauge and smaller shall have colour impregnated into insulation at time of manufacture. Conductors size No. 8 gauge and larger may be colour coded with adhesive colour coding tape but only black insulated conductors shall be employed in this case, except for neutrals which shall be white wherever possible.
- .7 Colour coding as follows:
 - .1 Phase "A" - Red
 - .2 Phase "B" - Black
 - .3 Phase "C" - Blue
 - .4 Control - Orange
 - .5 Ground - Green
 - .6 Neutral - White
- .8 Neatly train circuit wiring in cabinets, panels, pull boxes and junction boxes and hold with nylon cable ties.

3 Execution

3.01 Examination

- .1 Voltage Drop
 - .1 Ensure voltage drop in power and control conductors is in accordance with the requirements of the Electrical Code.
 - .2 Size conductors accordingly when sizes are not identified.
 - .1 Feeder conductors: maximum voltage drop of 2 per cent.
 - .2 Branch circuit conductors: maximum voltage drop of 3 per cent.
 - .2 Verify that mechanical work likely to damage wire and cable has been completed.
 - .3 Verify that raceway installation is complete and supported.

3.02 Preparation

- .1 Completely and thoroughly swab raceway before installing wire.

3.03 Installation

- .1 Route wire and cable as required to meet project conditions.
- .2 Install cable to CSA C22.1.
- .3 Conduit and cable supports
 - .1 All wiring to be installed in EMT at all exposed areas and in partitions unless otherwise specified.
 - .2 All mechanical equipment to be connected with liquid tight flexible conduit.
 - .3 Support cables above accessible ceiling, using spring metal clips to support cables from structure. Do not rest cable on ceiling panels.
- .4 Conductors
 - .1 Provide separate neutral for each circuit. Common neutrals not permitted.
 - .2 Use solid conductor for feeders and branch circuits 10 AWG and smaller.
 - .3 Use stranded conductors for control circuits.
 - .4 Use conductor not smaller than 12 AWG for power and lighting circuits.
 - .5 Use conductor not smaller than 16 AWG for control circuits.

- .6 Armoured cable (commonly referred to as BX) is only to be used for light fixture connections and limited to maximum 1830 mm in length.
- .7 Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 25 m.
- .5 Pulling conductors
 - .1 Pull all conductors into raceway at same time.
 - .2 Use suitable wire pulling lubricant for building wire 4 AWG and larger.
 - .3 Neatly train and lace wiring inside boxes, equipment, and panelboards.
 - .4 Protect exposed cable from damage.
- .6 Connectors
 - .1 Use suitable cable fittings and connectors.
 - .2 Clean conductor surfaces before installing lugs and connectors.
 - .3 Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - .4 Use split bolt connectors for copper conductor splices and taps 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 per cent of insulation rating of conductor.
 - .5 Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
 - .6 Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

3.04 Identification

- .1 Identify and colour code wire and cable to Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.
- .2 Where colour-coded tape is utilized, apply a minimum of 50 mm (2 inches) at terminations, junction and pull boxes and conduit fittings. Do not paint conductors under any condition.
- .3 Utilize colour coding on bussing in panels and, switchgear, disconnects, and metering cabinets to match conductor colour coding.

End of Section

1 General

1.01 Section Includes

- .1 Metal conduit.
- .2 Flexible metal conduit.
- .3 Liquid tight flexible metal conduit.
- .4 Electrical metallic tubing.
- .5 Fittings and conduit bodies.

1.02 References

- .1 Canadian Standards Association
 - .1 CSA C22.1 – Canadian Electrical Code, Part I, Safety Standard for Electrical Installations.
 - .2 Ontario Electrical Safety Code.
 - .3 CAN/CSA-C22.2 No. 18 – Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
 - .4 CSA C22.2 No. 45 – Rigid Metal Conduit.
 - .5 CSA C22.2 No. 45.1 – Rigid Metal Conduit - Steel.
 - .6 CSA C22.2 No. 56 – Flexible Metal Conduit and Liquid - Tight Flexible Metal Conduit.
 - .7 CSA C22.2 No. 83.1 – Electrical Metallic Tubing - Steel.
 - .8 CSA C22.2 No. 211.1 – Rigid Types EB1 and DB2/ES2 PVC Conduit.
 - .9 CSA C22.2 No.211.2 – Rigid PVC (Unplasticized) Conduit.
 - .10 CSA C22.2 No. 211.3 – Reinforced Thermosetting Resin Conduit (RTRC) on Fittings.
 - .11 CSA C22.2 No. 227.1 – Electrical Nonmetallic Tubing.
 - .12 CSA C22.2 No. 227.2.1 – Liquid-Tight Flexible Nonmetallic Conduit.

1.03 Project Record Documents

- .1 Accurately record actual routing of conduits larger than 51 mm.
- .2 Accurately record actual routing of all conduits installed below grade, regardless of size, including whether direct buried or installed in concrete duct bank.

1.04 Regulatory Requirements

- .1 Provide products listed and classified by CSA (Canadian Standards Association) as suitable for purpose specified and shown.

1.05 Delivery, Storage, and Handling

- .1 Accept conduit on site. Inspect for damage.
- .2 Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.06 Project Conditions

- .1 Verify that field measurements are as shown on drawings.
- .2 Verify routing and termination locations of conduit prior to rough-in.
- .3 Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

2 Products

2.01 Manufacturers

- .1 Where products are listed in this section based on a single manufacturer, the equivalent product from the following manufacturers is acceptable:
 - .1 Appleton.
 - .2 Columbia-MBF.
 - .3 Crouse-Hinds by Eaton.
 - .4 Hubbell.
 - .5 Thomas & Betts Ltd.

2.02 Conduit Requirements

- .1 Minimum size: 21 mm (3/4 inch) unless otherwise specified.
- .2 Outdoor locations, above grade: use rigid steel.
- .3 Wet and damp locations: use rigid and non-metallic tubing.
- .4 Dry locations:
 - .1 Concealed: Use electrical metallic tubing

- .2 Exposed: Use electrical metallic tubing.

2.03 Metal Conduit

- .1 Rigid Steel Conduit: C22.2 No. 45.1.
- .2 Rigid Aluminum Conduit: C22.2 No. 45.
- .3 Intermediate Metal Conduit (IMC): Rigid steel.
- .4 Fittings and Conduit Bodies: Material to match conduit.

2.04 Flexible Metal Conduit

- .1 Description: Interlocked steel construction.
- .2 Fittings: CSA C22.2 No. 56.

2.05 Liquid Tight Flexible Metal Conduit

- .1 Description: Interlocked steel aluminum construction with PVC jacket.
- .2 Fittings: CSA C22.2 No. 56.

2.06 Electrical Metallic Tubing (EMT)

- .1 Description: CSA C22.2 No. 83.1; galvanized tubing.
- .2 Fittings and Conduit Bodies: CSA C22.2 No. 83.1; steel type.

2.07 Electrical Nonmetallic Tubing (ENT)

- .1 Not permitted.

2.08 Conduit, Fittings, and Accessories

- .1 Conduit accessories, conduits and fittings conforming to CSA Standard C22.2 No. 18-1972.
- .2 Rigid conduit bushings:
 - .1 Thomas & Betts Ltd. - Series 5031.
- .3 EMT Connectors:
 - .1 Thomas & Betts Ltd. - Steel City TC 121E Series.
- .4 Ground Bushings:
 - .1 Thomas & Betts – Blackjack or 1220 Series.
- .5 Flexible conduit connectors:

- .1 Thomas & Betts Ltd. - Series 3110.
- .2 EMT couplings: steel concrete tight to match connectors.
- .6 Terminate rigid conduit entering boxes or enclosures with nylon insulated steel threaded bushings.
 - .1 Thomas & Betts – 8125 Series.
- .7 Terminate EMT entering boxes or enclosures with nylon insulated steel concrete tight connectors.
- .8 Terminate flexible conduit entering boxes or enclosures with nylon insulated steel connectors.
 - .1 Thomas & Betts – 5332 Series.

3 Execution

3.01 Installation

- .1 Install conduit to CSA C22.1.
- .2 Arrangement and supports
 - .1 Arrange supports to prevent misalignment during wiring installation.
 - .2 Arrange conduit to maintain headroom and present neat appearance.
 - .3 Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
 - .4 Group related conduits; support using conduit rack.
 - .5 Construct rack using steel channel; provide space on each for 25 per cent additional conduits.
 - .6 Fasten conduit supports to building structure and surfaces to Section 26 05 29.
 - .7 Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports
 - .8 Do not attach conduit to ceiling support wires.
 - .9 Route exposed conduit parallel and perpendicular to walls.
 - .10 Route conduit installed above accessible ceilings parallel and perpendicular to walls.
 - .11 Route conduit in and under slab from point-to-point.
 - .12 Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
 - .13 Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints.

- .3 Clearances
 - .1 Maintain adequate clearance between conduit and piping.
 - .2 Maintain 300 mm (12 inch) clearance between conduit and surfaces with temperatures exceeding 40 degrees C.
- .4 Conduit bends
 - .1 Install no more than equivalent of three 90 degree bends between boxes.
 - .1 Use conduit bodies to make sharp changes in direction, as around beams.
 - .2 Use hydraulic one-shot bender to fabricate bends in metal conduit larger than 50 mm size.
- .5 Install wall entrance seals where conduits pass through exterior walls below grade.
- .6 Provide expansion coupling in conduit runs at building expansion joints and in long runs subject to thermal expansion, all in accordance with manufacturer recommendations.
- .7 Cut conduit square using saw or pipe cutter; de-burr cut ends.
- .8 Bring conduit to shoulder of fittings; fasten securely.
- .9 Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- .10 Use conduit hubs or sealing locknuts to fasten conduit and to cast boxes.
- .11 Provide suitable pull string in each empty conduit except sleeves and nipples.
- .12 Ground and bond conduit to Section 26 05 26.
- .13 Identify conduit to Section 26 05 53.
- .14 Wiring Methods
 - .1 Install wiring in conduit unless otherwise specified.
 - .2 Install wiring and conduit work in a concealed manner. Surface conduit work is not permitted unless specifically noted.
 - .3 Use thin wall conduit, up to and including 53 mm (2 inch) conduit size, for branch circuit and feeder wiring in ceilings, furred spaces, and in hollow walls and partitions. Use rigid galvanized steel conduit for wiring in poured concrete, where exposed, and for conduit 65 mm or larger. Use rigid PVC conduit for wiring in slabs on grade and wiring below grade.
 - .4 Aluminium conduit may be used, in lieu of rigid steel conduit, in clean and dry locations, but shall not be used in poured concrete, or for signal and intercommunication systems wiring.

- .5 Flexible conduit and armoured cable will be accepted for a maximum length of 1500 mm for final connection to lighting fixtures. Do not connect from fixture to fixture.
- .6 Conduit manufacturer's touch-up enamel shall be used to repair all scratches and gouges on epoxy-coated conduit.

End of Section

1 General

1.01 Section Includes

- .1 Wall and ceiling outlet boxes.
- .2 Pull and junction boxes.

1.02 Related Requirements

- .1 Section 26 09 23 – Lighting Control Devices.
- .2 Section 26 27 16 – Electrical Cabinets and Enclosures.
- .3 Section 26 27 26 – Wiring Devices: Wall plates in finished areas, floor box service fittings, fire-rated poke-through fittings, and access floor boxes.

1.03 References

- .1 CSA C22.1 - Canadian Electrical Code, Part I, Safety Standard for Electrical Installations
- .2 Ontario Electrical Safety Code.
- .3 CAN/CSA-C22.2 No. 18 - Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
- .4 CSA C22.2 No. 18.1 (CSA/UL/ANCE) - Metallic Outlet Boxes.
- .5 CSA C22.2 No. 40 - Cutout, Junction and Pull Boxes.
- .6 CAN/CSA-C22.2 No. 85 - Rigid PVC Boxes and Fittings.

1.04 Closeout Submittals

- .1 Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.05 Regulatory Requirements

- .1 Provide products listed and classified by CSA (Canadian Standards Association) as suitable for the purpose specified and indicated.

2 Products

2.01 Outlet Boxes

- .1 Sheet Metal Outlet Boxes: CSA C22.2 No. 18, galvanized steel.
 - .1 Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 13 mm male fixture studs where required.

- .2 Concrete Ceiling Boxes: Concrete type.
- .2 Non-metallic Outlet Boxes: CSA C22.2 No. 18.
- .3 Cast Boxes: CSA C22.2 No. 18, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- .4 Wall Plates for Finished Areas: As specified in Section 26 27 26.

2.02 Pull Boxes and Junction Boxes

- .1 Sheet Metal Boxes: CSA C22.2 No. 18, galvanized steel.
- .2 Hinged Enclosures: As specified in Section 26 27 16.
- .3 Surface Mounted Cast Metal Box: CSA C22.2 No. 18, Type 4; flat-flanged, surface mounted junction box:
 - .1 Material: Cast aluminum.
 - .2 Cover: Provide with ground flange, neoprene gasket, and stainless steel cover screws.

2.03 Outlet Boxes

- .1 Conform to CSA C22.2 No. 18.
- .2 Where 103 mm (4 inch) square outlet boxes are installed in exposed concrete or cinder block finished areas, blocks will be cut as described in Division 04 as instructed under this Section. Cut openings to provide a close fit to boxes and covers so that edges of openings are not visible after installation of plates. Use of mortar to patch up openings that are cut too large or to patch ragged edges is not permitted.
- .3 Ceiling boxes: 103 mm (4 inch) octagon or square, complete with fittings, where required to support fixtures.
- .4 Switch and receptacle boxes:
 - .1 103 mm (4 inch) square with plaster ring, where flush mounted in plaster walls.
 - .2 Iberville 1104 series box, or equal, where flush mounted in wood or drywall, with stud fasteners as required.
 - .3 Masonry boxes in masonry walls.
- .5 Where boxes are surface mounted in unfinished areas they shall be FS conduits.
- .6 Standard outlet boxes manufactured from code gauge galvanized steel.
- .7 Provide a suitable outlet box for each light, switch, receptacle or other outlet, approved for the particular area it is to be installed.

- .8 Support outlet boxes independently of conduit and cable.
- .9 Locate outlet boxes, mounted in hung ceiling space, so they do not obstruct or interfere with the removal of lay-in ceiling tiles.
- .10 Offset outlet boxes, shown back to back in partitions, horizontally a minimum 150 mm (6 inch) to minimize noise transmission between adjacent rooms.
- .11 Use gang boxes at locations where more than one device, of the same system only, is to be mounted. Utilize separate boxes for each system.
- .12 Use tile wall covers where 103 mm (4 inch) square outlet boxes are installed in exposed concrete or cinder block in finished areas.
- .13 Provide flush mount boxes, panels, cabinets and electrical devices, which are installed in finished areas, with suitable flush trims and doors or covers, unless specifically noted otherwise.
- .14 Provide pre-formed polyethylene vapour barriers for all boxes located in walls with internal vapour barriers.

3 Execution

3.01 Examination

- .1 Verify locations of floor boxes prior to rough-in.

3.02 Installation

- .1 Install boxes to CSA C22.1.
- .2 Install in locations as shown on drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- .3 Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- .4 Electrical boxes are shown on drawings in approximate locations unless dimensioned. Adjust box location up to 3 m (10 feet) if required to accommodate intended purpose.
- .5 Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.
- .6 Maintain headroom and present neat mechanical appearance.
- .7 Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- .8 Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 150 mm (6 inch) from ceiling access panel or from removable recessed luminaire.
- .9 Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods.

- .10 Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- .11 Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- .12 Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- .13 Use flush mounting outlet box in finished areas.
- .14 Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- .15 Do not install flush mounting box back-to-back in walls; provide minimum 150 mm separation. Provide minimum 600 mm separation in acoustic rated walls.
- .16 Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- .17 Use stamped steel bridges to fasten flush mounting outlet box between studs.
- .18 Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- .19 Use adjustable steel channel fasteners for hung ceiling outlet box.
- .20 Do not fasten boxes to ceiling support wires.
- .21 Support boxes independently of conduit.
- .22 Use gang box where more than one device is mounted together. Do not use sectional box.
- .23 Use gang box with plaster ring for single device outlets.
- .24 Use cast outlet box in exterior locations exposed to the weather.
- .25 Use cast outlet box in wet locations.
- .26 Set floor boxes level.
- .27 Large pull boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.03 Adjusting

- .1 Adjust floor box flush with finish flooring material.
- .2 Adjust flush-mounting outlets to make front flush with finished wall material.
- .3 Install knockout closures in unused box openings.

3.04 Cleaning

- .1 Clean interior of boxes to remove dust, debris, and other material.
- .2 Clean exposed surfaces and restore finish.

End of Section

1 General

1.01 Section Includes

- .1 Nameplates and labels.
- .2 Wire and cable markers.
- .3 Conduit markers.
- .4 Receptacle labels.
- .5 Signage.

1.02 Related Requirements

- .1 Section 27 05 53 – Identification for Communications Systems.

1.03 Submittals

- .1 Product Data: Provide catalogue data for nameplates, labels, and markers.
- .2 Provide shop drawings of nameplates for Consultant's review prior to fabrication (scale 1:1)
- .3 Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.04 Regulatory Requirements

- .1 Provide products listed and classified by CSA (Canadian Standards Association) as suitable for the purpose specified and indicated.

2 Products

2.01 Nameplates and Labels

- .1 Nameplates:
 - .1 Engraved three-layer laminated plastic, letters on contrasting background.
 - .2 Colours to match existing building system, where applicable. If no building system exists, use the following:
 - .1 347/600 Volt System: White text on Blue Background.
 - .2 230/400 Volt System: White text on Blue Background.
 - .3 120/208 Volt System: Black text on White Background.

- .4 Fire Detection System: White text on Red Background.
- .5 Emergency Lighting System: Red text on White Background.
- .6 LV Systems: White text on Green Background.
- .7 [230/400 Volt Uninterruptable Power Supply (UPS): Black text on Yellow Background.]
- .8 120/208 Volt Uninterruptable Power Supply (UPS): White text on Orange Background.
- .3 Confirm colours with Engineer prior to ordering nameplates.
- .2 Equipment Nameplates to indicate:
 - .1 Equipment/Panelboard ID
 - .2 Ampacity.
 - .3 Voltage
 - .4 Number of Phases
 - .5 Number of wires in system
 - .6 Interrupting Capacity
 - .7 Size, number of poles, Panelboard ID, and circuit number of upstream overcurrent protection device.
 - .1 Location of upstream device if not in the same room.
- .3 Coordination Study Labels to Section 26 05 73.16.
- .4 Arc Flash Study Labels to Section 26 05 73.19.
- .5 Locations:
 - .1 Distribution panelboards, and individual distribution panelboard branch breakers.
 - .2 Receptacle panelboards.
 - .3 Each electrical distribution and control equipment enclosure.
 - .4 Uninterruptible Power Supply.
 - .5 Mechanical Equipment.
 - .6 UPS Receptacles.
 - .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

- .8 Terminal cabinets, junction boxes, and pull boxes: indicate system and voltage.
- .9 Transformers: indicate capacity, primary and secondary voltages.
- .6 Letter Size:
 - .1 Use 3 mm letters for identifying individual equipment and loads.
 - .2 Use 6 mm letters for identifying grouped equipment and loads.
- .7 Labels:
 - .1 Mechanically fastened with sheet metal screws, with 5 mm white letters on black background.
 - .2 White letters on red background for UPS and equipment, and devices downstream of UPS.
 - .3 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
 - .4 Wording on nameplates and labels to be approved by the Engineer prior to manufacture.
 - .5 Allow for minimum of twenty-five (25) letters per nameplate and label.
 - .6 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
 - .7 Terminal cabinets and pull boxes: indicate system and voltage.

2.02 Wiring Identification

- .1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.03 Wire Markers

- .1 Description: tape, split sleeve, or tubing type wire markers.
- .2 Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes and each load connection.
- .3 Legend:
 - .1 Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
 - .2 Control Circuits: Control wire number indicated on shop drawings.

2.04 Conduit Markers

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Location: Provide markers for each conduit longer than 2 m.
- .3 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .4 Colours to match equipment nameplate background colour:
 - .1 347/600 Volt System: Blue.
 - .2 230/400 Volt System: Blue.
 - .3 120/208 Volt System: Black.
 - .4 Fire Alarm System: Red.
 - .5 Emergency Lighting System: Red/White.
 - .6 LV Systems (EPO, Remote Monitoring, Generator Control, Communications): Green.
 - .7 [230/400 Volt Uninterruptable Power Supply (UPS): Yellow.]
 - .8 120/208 Volt Uninterruptable Power Supply (UPS): Orange
- .5 Confirm colours with Engineer prior to commencing rough-in.

2.05 Branch Breaker Labels

- .1 General:
 - .1 Legibly identify every circuit and circuit modification as to its clear, evident, and specific purpose or use. Include sufficient detail to allow each circuit to be distinguished from all others.
 - .2 Label spare positions that contain unused overcurrent devices or switches.
 - .3 Do not describe any circuit in a manner that depends on transient conditions of occupancy.
- .2 Switchboards, distribution panelboards, enclosed breakers, and disconnect switches:
 - .1 Locate identification at each switch.
 - .2 Branch breaker nameplates on switchboards, distribution panelboards and switchboards, and generator load breakers to indicate:
 - .1 Locate identification at each switch on a switchboard.
 - .2 Identification of downstream equipment fed from the breaker.

- .1 Location of downstream device if not in the same room.
 - .3 Breaker size and number of poles.
 - .4 Interrupting Capacity.
 - .5 Circuit number (where applicable).
 - .6 Do not describe any circuit in a manner that depends on transient conditions of occupancy.
- .3 Lighting and Receptacle Panelboards:
- .1 Provide a circuit directory that is located on the face or inside of the panel door.
 - .2 Do not describe any circuit in a manner that depends on transient conditions of occupancy.

2.06 Receptacle Labels

- .1 Label all receptacles with the panelboard ID and circuit number.
- .2 Use receptacle labels by electronic labeller Brother P-Touch, model PT-20/25, Dymo-Tape or approved equal.
- .3 Location: On receptacle wall plate.

3 Execution

3.01 Equipment Nameplates from Manufacturers

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.
- .2 Manufacturers' nameplates and CSA labels are to be visible and legible after equipment is installed. Provide warning signs, as specified, or to meet requirements of Inspection Department, Health and Safety, and the Consultant.
- .3 Label power outlets with circuit identification on visible portion of faceplate or surface mounted outlet box.

3.02 Conduit Identification

- .1 Locate labels as follows:
 - .1 At every end of every conduit, duct or cable run, adjacent to item of equipment serviced.
 - .2 On each exposed conduit, duct or cable passing through a wall, partition or floor (one on each side of such wall partition or floor).
 - .3 At intervals of 50'-0" along every exposed conduit, duct or cable run exceeding 50'-0" in length.

.4 At every access point on concealed conduit duct or cable.

.2 Place labels so as to be visible from 5'-0" above adjacent floor platform.

3.03 Preparation

.1 Degrease and clean surfaces to receive nameplates and labels.

3.04 Application

.1 Confirm colours prior to start of work.

.2 Install nameplate and label parallel to equipment lines.

.3 Secure nameplate to equipment front using adhesive.

.4 Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

.5 Identify conduit using field painting.

.6 Paint coloured band on each conduit longer than 2 m.

.7 Paint bands 6 m on centre.

3.05 Labelling

.1 Colour code wiring consistently throughout the installation and generally match colour coding of internal wiring of pre-wired components.

.2 Label wiring with point name using Thomas & Betts 12 character polestar metalized labels with 3 rows of characters per label, or equal by Brady. Label to occur as a minimum at both ends and at pull boxes of the wiring run.

.3 Identify all pull boxes, junction boxes, etc. (installed as part of this project or used by this project) with the exact use of the box. Indelible felt pen marker is acceptable.

.4 Label light control items with point name using Thomas & Betts 12 character label, or equal by Brady. Label to be black lettering on clear backing.

.5 Label relays and controllers inside panels using Thomas & Betts 12 character label, or equal by Brady.

.6 Provide red, 13 mm (1/2 inch) diameter, sticker on emergency light fixture frame. Include circuit number on sticker with thin permanent black mark pen.

3.06 Labels and Signs

.1 Manufacturers' nameplates and CSA labels are to be visible and legible after equipment is installed. Provide warning signs, as specified, or to meet requirements of Inspection Department, Health and Safety, and the Consultant.

- .2 Label power outlets with circuit identification on visible portion of faceplate or surface mounted outlet box.

End of Section

1 General

1.01 Section Includes

- .1 Electrical connections to equipment specified in other sections.

1.02 Related Requirements

- .1 Division 21 – Fire Suppression.
- .2 Division 22 – Plumbing.
- .3 Division 23 – Heating, Ventilating, and Air Conditioning.

1.03 References.

- .1 NEMA WD 1 - General Colour Requirements for Wiring Devices.
- .2 NEMA WD 6 - Wiring Devices - Dimensional Requirements.

1.04 Coordination

- .1 Obtain and review shop drawings, product data, and manufacturer's instructions for equipment provided under other sections.
- .2 Determine connection locations and requirements.
- .3 Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
- .4 Sequence electrical connections to coordinate with start-up schedule for equipment.

1.05 Submittals

- .1 Product Data: Provide wiring device manufacturer's catalogue information showing dimensions, configurations, and construction.
- .2 Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.06 Regulatory Requirements

- .1 Provide products listed and classified by testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

2 Products

2.01 Common Motor Requirements

- .1 Motors up to and including 1/3 HP, shall be 1 phase, 60 Hz, 120 volts.

- .2 Motors 1/2 HP and above shall be 3 phase, 60 Hz, 575 volts or 208 volts.

2.02 Cords and Caps

- .1 Attachment Plug Construction: Conform to NEMA WD 1.
- .2 Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
- .3 Cord Construction: NFPA 70, Type SJO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- .4 Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

3 Execution

3.01 Wiring of Equipment Provided Under Other Divisions

- .1 Use the following procedure with regard to wiring of motors and equipment provided under other Divisions.
- .2 The following equipment shall be responsibility of the trade supplying the equipment unless otherwise noted, in accordance with the requirements laid out in the individual section, or this division:
 - .1 Motors.
 - .2 Starters.
 - .3 Variable Frequency Drives.
 - .4 Motor Control Centres.
 - .5 Control wiring.
- .3 In every instance, install starter, motor control centre, variable frequency drivers (VFD), etc. and wire to line side of the starter, the Motor Control Centre, or VFD. Extend wiring from starter, motor control centre or VFD to motor as indicated.
- .4 Provide all wiring for starters and VFD's from supply to starter to VFD and to motor. Coordinate requirements with the appropriate trade.
- .5 Provide 500 mm of liquid tight flexible metal conduit for final connection to motor. Provide disconnect switches where required by code, and as indicated on the drawings.
- .6 Where individual starters and controls are grouped together provide a panel for mounting this equipment. Provide a feeder, main fused disconnect and a splitter of adequate size and capacity and wire to line side of the starters on this panel and from starters to motors.
- .7 Equipment, General

- .1 Ascertain exact locations of starters, motor control centres, motors, etc. from drawings and coordinate exact locations with the supplying trade.
- .2 Control wiring shall be the responsibility of the supplying trade.
 - .1 Control wiring shall be in accordance with Section 26 05 19, and Section 26 05 23.
 - .2 Control wiring shall be installed in conduit in accordance with Section 26 05 33.13.
- .8 Conveying Equipment (e.g. Elevators): in accordance with Section 26 05 83.14.
- .9 Plumbing Equipment
 - .1 Ascertain exact locations of starters, motor control centres, motors, infra-red plumbing fixture controls from Mechanical Drawings and coordinate exact locations with plumbing trade.
 - .2 Provide branch circuit wiring and an outlet for each infra-red plumbing fixture control.
 - .3 Control wiring shall be the responsibility of the plumbing trade, as described above.
- .10 HVAC Equipment
 - .1 Ascertain exact locations of starters, motor control centres, motors, motorized dampers, VAV boxes, and heating control valves from HVAC drawings and coordinate exact locations with HVAC Division.
 - .2 In the case of unit heaters, reheat coils and cabinet unit heaters, terminate wiring on terminals provided. Control wiring, thermostats, or other control devices shall be the responsibility of the HVAC trade, as described above.
 - .3 Provide branch circuit wiring and an outlet for each motorized damper, variable air volume (VAV) box, or heating control valve. Control wiring shall be the responsibility of the HVAC trade, as described above.

3.02 Examination

- .1 Verify that equipment is ready for electrical connection, wiring, and energization.

3.03 Electrical Connections

- .1 Make electrical connections to equipment manufacturer's instructions.
- .2 Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations.
- .3 Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.
- .4 Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field-supplied attachment plug is indicated.

- .5 Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- .6 Install disconnect switches, controllers, control stations, and control devices as indicated.
- .7 Modify equipment control wiring with terminal block jumpers as indicated.
- .8 Provide interconnecting conduit and wiring between devices and equipment where indicated.
- .9 Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

End of Section

SECTION 5: SCHEDULES

Schedules are posted separately and will need to be **completed online only** through the Bidding System by the bidder as part of your bid submission.

Please note that the Schedules are subject to change/addition/deletion by addendum(s) issued by the town. Following the issuance of each addendum, such changes will be reflected in the electronic Schedules to be completed online only. The revised Schedules (in pdf format) will be uploaded to the Bidding System as a separate document. It is the bidder's responsibility to review all addendums and ensure that the bid is submitted based on the most current requirements.

For greater certainty, the bidder shall submit their bid by completing all Schedules and fields in the online Bidding System. Any bid submitted on the basis of the preview Schedules may, in the town's sole discretion, be disqualified on the basis of being incomplete.

APPENDIX A - Supplementary Conditions to Contract CCDC 2-2008
Revised: April 1, 2019

SC 1. GENERAL

These Supplementary Conditions presuppose the use of the Standard Construction Document CCDC 2-2008 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 Condition 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. ARTICLE A-1 THE WORK

1. After the words "in the year ___" in the last line of the Paragraph 1.3 - add the words:
" , and attain *Total Performance of the Work* within thirty (30) calendar days of attaining *Substantial Performance of the Work* or as otherwise stated in the tender document or as agreed in writing between the *Owner, Consultant and Contractor*".

SC 3. ARTICLE A-3 CONTRACT DOCUMENTS

1. Add documents to the existing list of *Contract Documents* in paragraph 3.1 as follows:
 - Addenda, as issued
 - the Special Provisions
 - Supplementary Conditions to Contract CCDC 2-2008
 - *Contractor's Bid Submission Including Schedule of Prices*
 - the *Specifications*
 - *Drawings*

SC 4. ARTICLE A-5 PAYMENT

1. Delete paragraphs 5.2 and 5.3 in their entirety and replace with the following paragraphs 5.2, 5.3 and 5.4:
 - 5.2 As such payments become due, the *Contractor* shall, in accordance with the terms of its agreements with any *Subcontractors, Suppliers* and workers, pay all of its *Subcontractors, Suppliers* and workers in full on account of work properly performed or *Products* properly supplied, as applicable, less any holdback monies retained in compliance with the *Construction Act, R.S.O. 1990, c. C.30 (Ontario)* as amended.
 - 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.
 - 5.4 Interest
 - .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 on such unpaid

amounts shall also become due and payable until payment, at the rate as prescribed in the *Construction Act, R.S.O. 1990, c. C.30* (Ontario) as amended.

- .2 Interest shall apply at the rate and in the manner prescribed by paragraph 5.4.1 of this Article on the settlement amount of any claim in dispute that is resolved either pursuant to Part 8 of the General Conditions - DISPUTE RESOLUTION or otherwise, from the date the amount would have been due and payable under the Contract, had it not been in dispute, until the date it is paid.

SC 5. ARTICLE A-9 CONFLICT OF INTEREST

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

- 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 Town of Oakville 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 It is of the essence of the Contract that the Owner shall not have direct or indirect liability to any *Subcontractor* or *Supplier*, and that the Owner relies on the maintenance of an arm's-length relationship between the *Contractor* and its *Subcontractors* and *Suppliers*. Consistent with this fundamental term of the Contract, the *Contractor* will not enter into any agreement or understanding with any *Subcontractor* or *Supplier*, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to cooperate in the presentation of a claim for payment against the Owner, directly or through the *Contractor*, where such claim is, in whole or in part, in respect of a disputed claim by the *Subcontractor* or *Supplier* against the *Contractor*, where the payment to the *Subcontractor* or *Supplier* by the *Contractor* is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the Owner, failing which the *Contractor* shall be saved harmless from all or a portion of those claims. The *Contractor* acknowledges that any such agreement would undermine the required arm's-length relationship and constitute a conflict of interest.
- 9.5 Notwithstanding paragraph 7.1.2 of GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE *CONTRACTOR'S* RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT as amended, a breach of this Article 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.

SC 6. ARTICLE A-10 CONFIDENTIALITY

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

- 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 7. ARTICLE A-11 SEVERABILITY

1. Add new Article A-11 SEVERABILITY as follows:

- 11.1 If any provision of this Contract is found to be invalid or unenforceable in any circumstances, the remainder of this Contract, and the application of such provision in any other circumstances, shall not be affected.

SC 8. ARTICLE A-12 TIME IS OF ESSENCE

1. Add new Article A-12 TIME IS OF ESSENCE as follows:

- 12.1 Time shall be of the essence of the *Contract* and under all *Contract Documents*.

SC 9. DEFINITIONS

1. Delete Definitions 6, 8 16 and 25 and replace with new definitions as follows:

- 6. Contract Documents** – the *Contract Documents* consist of those documents listed in Article A-3 of the Agreement - CONTRACT DOCUMENTS and amendments agreed upon in writing between the parties.
- 8. Contract Time** – The *Contract Time* is the time stipulated in paragraph 1.3 of Article A-1 of the Agreement - THE WORK from commencement of the *Work* to the date of *Substantial Performance of the Work*.
- 16. Provide** – *Provide* means to supply and install or supply, install or connect as applicable, complete and in place, including accessories, finishes, tests, services required to render each item so specified complete and ready for use. *Provide* has this meaning whether or not the first letter is capitalized.
- 25. Work** – The *Work* means the total construction, *Product*, installation, *Commissioning*, checkout, start-up testing and related services required by the *Contract Documents*.

2. Add new definitions as follows:
- 27. Applicable Laws** – *Applicable Law* and *Applicable Laws* means all public laws, statutes, regulations, transactions, codes, acts, orders, by-laws, rules, judgments, 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.
- 28. 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.
- 29. 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.
- 30. Commissioning** - *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.
- 31. 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*.
- 32. 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, or 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, the Queen or Her 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*.

- 33. Make Good** – *Make Good* or *Making Good* means to restore new or existing work that has been rejected by the *Consultant* or the *Owner*, damaged, cut, or patched during the *Work*. In addition, *Make Good* or *Making Good* requires the use of materials identical to the original materials, with visible surfaces matching the appearance of the original surfaces in all details, and with no apparent junctions between restored and original surfaces. Where original materials are not available, the *Contractor* shall propose substitute materials for review by the *Consultant* prior to ordering such materials or commencing *Making Good*. *Making Good* may require replacement of affected work in whole or in part.
- 34. Overhead** - *Overhead* 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 and 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.
- 35. 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*.
- 36. 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 will result 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*.

- 37. 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.
- 38. 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).
- 39. Submittals** – *Submittals* are documents or items required by the *Contract Documents* to be provided by the *Contractor* such as: *Shop Drawings*, samples, models, mock-ups to indicate details or characteristics, before the portion of the Work that they represent can be incorporated into the Work; and, As-Built Drawings and manuals to provide instructions to the operation and maintenance of the Work.
- 40. Total Performance of the Work** – *Total Performance of the Work* means when the entire *Work*, except for those items arising from GC 12.3 – WARRANTY, has been performed in accordance with the requirements of the *Contract Documents* and is so certified by the *Consultant*.

SC 10. GC 1.1 CONTRACT DOCUMENTS

1. Add new sentence to the end of paragraph 1.1.6:

“The *Specifications* are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the *Contract Documents* will be construed to place responsibility on the *Consultant* to settle disputes among the *Subcontractors* and *Suppliers* or as between them and the *Contractor* with respect to such divisions.”
2. Delete subparagraph 1.1.7 in its entirety and replace with the following:
 - 1.1.7 If there is a conflict within the *Contract Documents*, the order of priority of documents, from highest to lowest, shall be:
 - *Change Orders* and/or *Change Directives*
 - The executed Agreement Between *Owner* and *Contractor* CCDC 2-2008
 - *Contractor's* Bid Submission Including Schedule of Prices
 - Addenda, as issued
 - Special Provisions
 - Supplementary Conditions to Contract CCDC 2-2008
 - Definitions in CCDC 2-2008 Stipulated Price Contract
 - the General Conditions in CCDC-2-2008 Stipulated Price Contract
 - the *Specifications*
 - *Drawings*
 - Town's General Conditions, Instructions to Bidders and Liability and Insurance Requirements
 - 1.1.7.1 *Drawings* of larger scale shall govern over those of smaller scale of the same date.
 - 1.1.7.2 Dimensions shown on *Drawings* shall govern over dimensions scaled from *Drawings*.
 - 1.1.7.3 Later dated documents shall govern over earlier documents of the same type.
 - 1.1.7.4 In case of discrepancies, noted materials and annotations shall take precedence over graphic indications in the *Contract Documents*.

1.1.7.5 Architectural *Drawings* shall have precedence over structural, plumbing, mechanical, electrical and landscape *Drawings* insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts and architectural elements of construction, it being understood that the integrity and installation of the systems designed by the *Consultant* or its sub- *Consultants* are to remain with each of the applicable drawing disciplines.

3. Delete paragraph 1.1.8 and 1.1.9 in their entirety and replace with the following:

1.1.8 The *Owner* shall provide the *Contractor*, without charge, a maximum of six (6) copies of the *Contract Documents* to perform the Work. The *Contractor* is responsible for the provision of any additional sets required in order to complete the Work, at no cost to the *Owner*.

1.1.9 *Specifications, Drawings*, models, and copies thereof furnished by the *Consultant* are not the *Contractor's* property, with the exception of the signed *Contract* sets, which shall belong to each party to the *Contract*. All *Specifications, Drawings* and models furnished by the *Consultant* are to be used only with respect to the *Work* and are not to be used on other work. These *Specifications, Drawings* and models are not to be copied or altered in any manner without the written authorization of the *Consultant*. *Contracts, Drawings, Specifications*, models, documents and copies thereof furnished by the *Contractor* or the *Owner* are and shall remain the property of the *Owner*, with the exception of the signed contract set belonging to the *Contractor*. Such documents and models are to be used by the *Contractor* only with respect to the *Work* and are not to be used on any other work. Such documents and models are not to be copied or revised in any manner without the written authorization of the *Owner*.

4. Add new paragraphs 1.1.11 and 1.1.12 as follows:

1.1.11 All *Products*, materials and equipment shall be in compliance with, but not limited to, current *Occupational Health and Safety Act*, Revised Statutes of Ontario, 1990 Chapter 01, as amended and Ontario Regulation 213/91, as amended and other relevant and current legislation pertaining to health and safety work practices on a work site.

1.1.12 Throughout the *Contract Documents* reference to the "General Conditions of the Contract" shall imply the inclusion of these "Supplementary Conditions".

SC 11. GC 1.2 LAW OF THE CONTRACT

1. Add new paragraphs 1.2.2, 1.2.3 and 1.2.4 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 Region of Halton 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 Region of Halton court as set out above.

1.2.3 The *Owner* and the *Contractor* acknowledge and agree that:

(i) this Agreement resulted from a procurement process (within the meaning set out in Section 87.3 of the *Construction Act, R.S.O. 1990, c. C.30* (Ontario) as amended) that was commenced, and the Agreement was signed, on or after July 1, 2018, but before October 1, 2019; and

(ii) amendments to the *Construction Act, R.S.O. 1990, c. C.30* (Ontario) that are to be proclaimed and come into force on July 1, 2018 are applicable to this Agreement, but amendments to the *Construction Act, R.S.O. 1990, c. C.30* (Ontario) that are to be proclaimed and come into force on October 1, 2019 are not applicable to this Agreement; and

(iii) the *Contractor* will incorporate into its contracts with *Subcontractors* and *Suppliers*, and ensure that all *Subcontractors* and *Suppliers* are made aware of, these acknowledgements and agreements.

1.2.4 The *Contractor* shall comply with all municipal by-laws as they pertain to the Town of Oakville 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 GC 7.1 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 12. 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 13. 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 14. GC 1.5 EXAMINATION OF DOCUMENTS AND SITE

1. Add new general condition GC 1.5 EXAMINATION OF DOCUMENTS AND SITE as follows:
 - 1.5.1 The *Contractor* declares and represents that before tendering for the *Work* (if applicable), and in entering into the *Contract* with the *Owner* for the performance of the *Work*, it has either investigated for itself the character of the *Work* to be done and all local conditions that would reasonably be discoverable, or that, not having so investigated, the *Contractor* has assumed and does hereby assume all risk of conditions reasonably discoverable, that are now existing or arising in the course of the *Work* which might or could make the *Work*, or any items thereof more expensive in character, or more onerous to fulfil, than was contemplated or known when the tender was made or the *Contract* signed.

SC 15. 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:

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.

SC 16. GC 1.7 NON-DISCLOSURE AND NO COMMENT

1. Add new general condition GC 1.7 NON-DISCLOSURE AND NO COMMENT as follows:
 - 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 17. GC 1.8 PATENTS AND OTHER INTELLECTUAL PROPERTY

1. Add new general condition GC 1.8 PATENTS AND OTHER INTELLECTUAL PROPERTY as follows:
 - 1.8.1 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 18. GC 2.1 AUTHORITY OF THE CONSULTANT

1. Delete from the end of paragraph 2.1.2, the following:
“, the *Contractor*”
2. Delete from paragraph 2.1.3, the following:
“against whom the *Contractor* makes no reasonable objection and”

SC 19. GC 2.2 ROLE OF THE CONSULTANT

1. Add new sentence to the end of paragraph 2.2.2:
“The *Contractor* shall not be entitled to rely on such visits as a limitation of its obligations under the *Contract Documents*.”
2. Delete from the beginning of paragraph 2.2.7, the following:
“Except with respect to GC5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER,”
3. Add to the end of paragraph 2.2.10, the following:
“and not more than five (5) *Working Days* after receipt of the written query unless otherwise agreed to by the parties.”
4. Delete paragraph 2.2.13 in its entirety and replace with the following:
2.2.13 During the progress of the *Work*, the *Consultant* will furnish *Supplemental Instructions* to the *Contractor* with reasonable promptness, but not more than five (5) *Working Days* after receipt of a written *Request for Information* from the *Contractor*, or in accordance with a schedule for such instructions agreed to by the *Consultant* and the *Contractor*. If, in the opinion of the *Contractor*, performance of the *Supplemental Instruction* will result in an increase in the *Contract Price* or to the *Contract Time*, the *Contractor* shall, within five (5) *Working Days* of receipt of the *Supplemental Instruction*, provide the *Consultant* with *Notice in Writing* that there will be an increase in *Contract Price* and/or *Contract Time*. Failure to provide the *Notice in Writing* shall be a deemed acceptance of the *Supplemental Instruction* by the *Contractor* without adjustment in the *Contract Price* or *Contract Time* for which a *Change Directive* will be issued.
5. Delete 2.2.14 in its entirety and replace with the following:
2.2.14 The *Consultant* will review and take appropriate action upon *Shop Drawings*, samples and other *Contractor's Submittals* which are provided in accordance with the *Contract Documents*.

6. In paragraph 2.2.17, in the second sentence of the paragraph, add after “, the *Consultant* does not guarantee”, the following:
“to the *Contractor*”
7. Add to the end of paragraph 2.2.18, 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”.
8. Add new paragraph 2.2.19 as follows:

2.2.19 The *Consultant* or the *Owner*, acting reasonably, may require the *Contractor* to remove from the *Project* any personnel of the *Contractor*, including *Project* managers and superintendents. Such persons shall be replaced by the *Contractor* in a timely fashion to the satisfaction of the *Consultant* or the *Owner*, as the case may be, at no cost to the *Owner*.

SC 20. GC 2.3 REVIEW AND INSPECTION OF THE WORK

1. Delete paragraph 2.3.2 in its entirety and replace with the following:

2.3.2 If work is designated for tests, inspections or approvals in the *Contract Documents*, or by the *Consultant*’s instructions, or by the laws or ordinances of the *Place of the Work*, the *Contractor* shall give the *Consultant* and *Owner* reasonable notification of when the work will be ready for review and inspection. The *Contractor* shall arrange for and shall give the *Consultant* and *Owner* two (2) *Working Days* of the date and time of inspections by other authorities.
2. Delete paragraph 2.3.3 in its entirety and replace with the following:

2.3.3 The *Contractor* shall furnish promptly two (2) copies to the *Consultant* and one (1) copy to the *Owner* of all certificates and inspection reports relating to the *Work*, and in any event no later than two (2) *Working Days* from the date of the inspection.
3. Add new paragraph 2.3.8, 2.3.9, 2.3.10 and 2.3.11 as follows:

2.3.8 The *Contractor* shall immediately inform the *Owner* and the *Consultant* of any notices, warnings or asserted violations issued by any regulatory or government agencies having jurisdiction relating to the *Work*.

2.3.9 No review of the *Work* by the *Owner* or the *Consultant* shall relieve the *Contractor* from its responsibility to perform the *Work* in accordance with the *Contract Documents*.

2.3.10 Where standards of performance are specified in the *Contract Documents* and the *Work* does not comply with the performance specified, such deficiency shall be corrected as directed by the *Consultant*. Any testing of work identified as defective in accordance with GC 2.4, including retesting required by the *Owner* to verify performance, shall be done at the *Contractor*’s expense.

2.3.11 The *Consultant* may conduct periodic reviews of the *Work* in progress, to determine general conformance with the requirements of the *Contract Documents*. Such reviews, or lack thereof, shall not give rise to any claims by the *Contractor* in connection with construction means, methods, techniques, sequences and procedures, nor in connection with construction safety at the *Place of Work*, responsibility for which belongs exclusively to the *Contractor*. The undertaking of periodic site review by the *Consultant* or *Owner* and their employees and agents shall not be construed as supervision of actual construction, nor make them responsible for providing a safe place for work.

SC 21. GC 2.4 DEFECTIVE WORK

1. Delete paragraph 2.4.1 in its entirety and replace with the following:
 - 2.4.1 The *Contractor* shall promptly correct defective work that has been rejected by the *Consultant* or the *Owner* as failing to conform to the *Contract Documents* at the *Contractor's* expense, whether or not the defective work has been incorporated in the *Work* and whether or not the defect is the result of poor workmanship, use of defective *Products* or damage through carelessness or other act or omission of the *Contractor*.
2. 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 *Owner* or the *Consultant*.
 - 2.4.1.2 The *Contractor* shall prioritize the correction of any defective work, which, in the sole discretion of the *Owner*, adversely affects the day to day operations of the *Owner* or which, in the sole discretion of the *Consultant*, adversely affects the progress of the *Work*.
3. Delete paragraph 2.4.2 in its entirety and replace with the following:
 - 2.4.2 The *Contractor* shall promptly, at its expense, *Make Good* the work of the *Owner's* own forces or of any other *contractors* destroyed or damaged by, and make any alterations necessitated by, the *Contractor's* removal, replacement or re-execution of defective work.

If in the opinion of the *Consultant* or *Owner* it is not expedient to correct defective work or work not performed as provided in the *Contract Documents*, the *Owner* may deduct from the amount otherwise due to the *Contractor* the value of such work as is necessary to correct any non-compliance with the *Contract Documents*. If the *Owner* and the *Contractor* do not agree on the difference in value, they shall refer the matter to the *Consultant* for a determination.
4. Add new paragraph 2.4.4 as follows:
 - 2.4.4 Neither acceptance of the *Work* by the *Consultant* or the *Owner*, nor any failure by the *Consultant* or the *Owner* to identify, observe or warn of defective *Work* or any deficiency in the *Work* shall relieve the *Contractor* from the sole responsibility for rectifying such defect or deficiency at the *Contractor's* sole cost.

SC 22. GC 3.1 CONTROL OF THE WORK

1. In paragraph 3.2.1, after “construction means, methods, techniques,” add the following:
“schedules,”
2. Add new paragraphs 3.1.3 and 3.1.4, as follows:
 - 3.1.3 Prior to commencing the *Work* and individual procurement, fabrication and construction activities, the *Contractor* shall verify, at the *Place of the Work*, all relevant measurements and levels necessary for the proper fabrication, assembly, installation and completion 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 in the *Contract Documents*, the *Contractor* shall immediately notify the *Consultant* in writing and obtain *Supplemental Instructions* from the *Consultant* before proceeding with any part of the affected work.
 - 3.1.4 Notwithstanding the provisions of paragraphs 3.1.1 and 3.1.2, the *Owner* shall have access to the site at all times to observe all aspects of construction. Such access shall in no circumstances affect the obligations of the *Contractor* to fulfill its contractual obligations. All work, means, methods, techniques and procedures shall be performed in strict compliance with current *Occupational Health and Safety Act*, Revised Statutes of Ontario, 1990 Chapter 01, as amended and Ontario Regulation 213/91, as amended and other applicable legislation as it relates to health and safety of work site, personnel, occupants, and public.

SC 23. GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

1. Delete subparagraphs 3.2.1 and replace with the following:
 - 3.2.1 The *Owner* may require the *Contractor* to enter into further contracts for work outside the scope of the *Contract* and for which a *Change Order* will be provide and a cash allowance allocated.
2. Delete subparagraph 3.2.2.1 in its entirety and replace with the following:
 - 3.2.2.1 Take all reasonable, practical and prudent steps to not interfere with the co-ordination of the activities and work of other *contractors* and *Owner's* own forces so as to not conflict with the *Work* of the *Contract*,
3. Delete subparagraph 3.2.2.2 in its entirety.
4. Add new subparagraph 3.2.3.4 as follows:
 - 3.2.3.4 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***, the *Contractor* will 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 24. GC 3.3 TEMPORARY WORK

1. Amend paragraph 3.3.2, in the second line after the words “where required by law”, add “or the *Consultant*”.

SC 25. GC 3.4 DOCUMENT REVIEW

1. Delete paragraph 3.4.1 in its entirety and replace with the following:
 - 3.4.1. 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*.
2. Add new paragraphs 3.4.2, 3.4.3, 3.4.4 and 3.4.5 as follows:
 - 3.4.2 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.
 - 3.4.3 The issuance of Requests for Information by the *Contractor* shall not entitle the *Contractor* to any increases to the *Contract Price* or *Contract Time*.
 - 3.4.4 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.
 - 3.4.5 The lack of reference on a drawing or in a specification to labour or *Products* that are required or normally recognized within the applicable trade practice as being necessary for the complete execution of the *Work* shall not constitute an error, inconsistency or omission.

SC 26. GC 3.5 CONSTRUCTION SCHEDULE

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

3.5.1 The *Contractor* shall:

- .1 within ten (10) *Working Days* following the notice of award of the *Contract*, prepare and submit to the *Owner* and the *Consultant* for their review, 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 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.
 - .2 If the construction schedule submitted by the *Contractor* is not accepted by the *Owner* and the *Consultant*, the *Contractor* shall, within five (5) *Working Days*, make revisions to the construction schedule until it is accepted by the *Owner* and the *Consultant*. Notwithstanding any other terms of this *Contract*, the *Contractor* shall not be entitled to receive any payment from the *Owner* until a construction schedule has been submitted by the *Contractor* and accepted by the *Owner* and the *Consultant*;
 - .3 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 3.5 - CONSTRUCTION SCHEDULE;
 - .4 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 3.5 - 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
 - .5 if, after applying the expertise and resources required under subparagraph 3.5.1.3, the *Contractor* forms the opinion that the variation or slippage in schedule reported pursuant to subparagraph 3.5.1.4 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 3.5.2, 3.5.3, 3.5.4, 3.5.5 and 3.5.6 as follows:
- 3.5.2 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 3.5.1.4, the *Contractor* shall within five (5) *Working Days* 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.
 - 3.5.3 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.

- 3.5.4 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.
- 3.5.5 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.
- 3.5.6 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 27. GC 3.6 SUPERVISION

1. Delete paragraph 3.6.1 in its entirety and replace with the following:
 - 3.6.1 The *Contractor* shall furnish a competent, qualified 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 3.6.3, 3.6.4, 3.6.5, 3.6.6, 3.6.7 and 3.6.8 as follows:
 - 3.6.3 The *Contractor* shall provide all necessary supervision and 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 the absence of the construction superintendent. The *Contractor* shall be responsible for the *Place of Work* at all times.

- 3.6.4 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.
- 3.6.5 The *Contractor* shall provide the *Consultant* and the *Owner* with the telephone and the email 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*.
- 3.6.6 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*.
- 3.6.7 The superintendent shall not be employed in any other capacity at the *Place of Work*.
- 3.6.8 The *Contractor* acknowledges that the replacement of the construction superintendent or *Project* team members may 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*. If replacement of any team members results in a possible delay to the *Project*, it will be the responsibility of the *Contractor* to make-up any such delays, at no cost to the *Owner*.

SC 28. GC 3.7 SUBCONTRACTORS AND SUPPLIERS

1. Add to the end of paragraph 3.7.2,
"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 3.7.4, the following:
"through a *Change Order*."
3. Add new paragraph 3.7.7 as follows:

3.7.7 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 29. GC 3.8 LABOUR AND PRODUCTS

1. Delete paragraph 3.8.2 in its entirety and replace with the following:

3.8.2 Unless otherwise specified in the *Contract Documents*, *Products* provided shall be new and as specified. The *Contractor* shall not provide substitutions for specified *Products* without the express written consent of the *Consultant* or the *Owner*.

2. Add new paragraphs 3.8.4, 3.8.5, 3.8.6, 3.8.7, 3.8.8, 3.8.9, 3.8.10, 3.8.11, 3.8.12 and 3.8.13 as follows:
 - 3.8.4 The cost for overtime required beyond the normal *Working Day* to complete individual construction operations of a continuous nature, 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*.
 - 3.8.5 The *Contractor* shall neither permit nor allow (a) under aged persons contrary to *Applicable Laws*, nor (b) the introduction or use of alcoholic beverages, cannabis or illegal narcotics on or about the *Place of the Work*.
 - 3.8.6 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.
 - 3.8.7 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*.
 - 3.8.8 Where required by the *Consultant* or the *Owner*, 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*.
 - 3.8.9 The *Consultant's* or *Owner'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*.
 - 3.8.10 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.
 - 3.8.11 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 *Consultant*.
 - 3.8.12 Specified trade contractors working in Oakville are required to have a valid business licence. Visit the Business Licensing page to review the requirements and find out how to apply for a licence.
<https://www.oakville.ca/townhall/licensed-contractors.html>
 - 3.8.13 The *Contractor* represents and warrants that the *Products* provided for in accordance with the *Contract* are not subject to any conditional sales contract and are not subject to any security rights obtained by any third party which may subject any of the *Products* to seizure and/or removal from the *Place of the Work*.

SC 30. GC 3.11 USE OF THE WORK

1. Add to the end of paragraph 3.11.2 the following:
“or impact the structural or future material use of the *Work*”.
2. Add new paragraph 3.11.3 as follows:
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 31. GC 3.13 CLEANUP

1. Add new paragraphs 3.13.4, 3.13.5 and 3.13.6 as follows:
3.13.4 All cleanup performed under items 3.13.1, 3.13.2 and 3.13.3 shall be to the satisfaction of the *Consultant* and the *Owner*.
3.13.5 *Owner* shall have the right perform the cleaning and to set-off the cost of cleaning to the *Contractor*, where items 3.13.1, 3.13.2 and 3.13.3 are not carried out after the *Owner* has provided two (2) *Working Days* written notice to do so.
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 32. GC 3.14 STANDARD OF CARE

1. Add new general condition GC 3.14 PERFORMANCE BY CONTRACTOR as follows:
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 33. GC 3.15 SECURITY

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

- 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 shall include fencing and/or hoarding and may require other measures as required.

SC 34. GC 3.16 INTERFERENCE

1. Add new general condition GC 3.16 INTERFERENCE as follows:

- 3.16.1 If the *Work*, in whole or in part, involves the renovation of, or addition to, existing and occupied premises:
- .1 the *Contractor* shall maintain normal business operations and traffic flow, with a minimum of inconvenience to the tenants and occupants of the *Place of the Work*;
 - .2 subject to the provisions of the *Contract Documents*, the *Contractor* shall ensure that no essential services such as electric power, water supply or other public utilities are interrupted;
 - .3 in every case where an interruption to existing services or utilities is to occur during execution of the *Work*, the *Contractor* shall give the *Owner* five (5) *Working Days*' prior written notice. The *Contractor* shall reschedule any such interruption, at no additional cost to the *Owner*, if requested to do so in writing by the *Owner*;
 - .4 subject to work restrictions set out elsewhere in the *Contract Documents*, any work that generates excessive or prolonged noise or percussion sounds shall not be carried out by the *Contractor* between the hours of 7:00 p.m. and 7:00 a.m. or on Sundays or holidays subject to applicable by-laws; and
 - .5 subject to work restrictions set out elsewhere in the *Contract Documents*, any work that generates excessive dust or odours shall be carried out by the *Contractor* between the hours of 7:00 p.m. and 7:00 a.m. or on Sundays or holidays as may be agreed upon between the *Contractor* and the *Owner*, subject to applicable by-laws. Lump Sum bid must include all costs associated with such work.

SC 35. GC 4.1 CASH ALLOWANCES

1. Delete paragraph 4.1.4 in its entirety and replace with the following:

- 4.1.4 Where the actual cost of the *Work* under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the *Consultant's* direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the *Contract Price* for *Overhead* and profit. Only where the actual cost of the *Work* under all cash allowances exceeds the total amount of all cash allowances shall the *Contractor* be compensated for the excess incurred and substantiated, plus an amount for *Overhead* and profit on the excess only, as set out in the *Contract Documents*.

2. Delete paragraph 4.1.5 in its entirety and replace with the following:

- 4.1.5 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the *Contract Price* by *Change Order* without any adjustment for the *Contractor's Overhead* and profit on such amount.

3. 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 36. GC 4.2 CONTINGENCY ALLOWANCES

1. Add new paragraph 4.2.5:

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*.

2. Add new paragraph 4.2.6:

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 37. GC 4.3 PROVISIONAL AMOUNTS

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

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

SC 38. GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

1. Revise the heading to read, "**GC 5.1 FINANCING INFORMATION REQUIRED**".

2. Delete paragraph 5.1.1 in its entirety in its entirety and replace with the following:

5.1.1 The *Owner* and *Contractor* shall provide each other with timely *Notice in Writing* of any material change in their financial ability to fulfil their respective obligations under the *Contract*.

3. Delete paragraph 5.1.2 in its entirety.

SC 39. GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

1. 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."

2. Add to the end of paragraph 5.2.6, the following:

"The statement shall include the *Contract* number, *Project* name and purchase order number."

3. Add to the end of paragraph 5.2.7, 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*.”

4. Add new paragraphs 5.2.8, 5.2.9, 5.2.10, 5.2.11, 5.2.12, 5.2.13 and 5.2.14, as follows:

5.2.8 The *Contractor* must provide with each application 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.

5.2.9 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.

5.2.10 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 certificates, 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*.

5.2.11 The *Contractor* shall submit its formal applications for payment, including a breakdown of approved *Change Orders* and percentage completed of each and all other required *Submittals* as stated in the *Contract Documents*, to the *Consultant* in a form satisfactory to the *Owner*. Deviation or incomplete submissions with respect to the approved breakdown will require resubmission of the application for payment

5.2.12 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.

5.2.13 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.

5.2.14 The *Contractor* shall prepare current *As-Built Drawings* in electronic format during the course of the *Work*, which current *As-Built Drawings* shall be maintained by the *Contractor* and made available to the *Consultant* for review with each application for progress payment. The *Consultant* shall retain a reasonable amount from any progress payment for the value of the *As-Built Drawings* not presented for review.

SC 40. GC 5.3 PROGRESS PAYMENT

1. Delete from the first line of subparagraph 5.3.1.2 the words "calendar days" and substitute the words:

"Working Days".

2. Delete subparagraph 5.3.1.3 in its entirety and replace with the following:

5.3.1.3 The *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement - PAYMENT on or before twenty (20) *Working Days* after the date of a certificate of payment issued by the *Consultant*.

3. Add new paragraph 5.3.2, 5.3.3 and 5.3.4 as follows:

5.3.2 If the *Contractor* fails to comply with GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT or GC 10.4 – WORKERS' COMPENSATION, the *Owner* shall not be required to make payments to the *Contractor* until the obligation has been complied with.

5.3.3 All progress payments are not conclusive as to the value or quality of *Work* performed, and are subject to reopening and readjustment, until and including the date that the *Owner* releases the holdback for finishing work under the *Construction Act*.

5.3.4 Certificates for payment may provide for retention of amounts as determined by the *Consultant* to ensure correction of deficient work done or unacceptable *Products* provided.

SC 41. GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

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

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

- .2 Add new paragraphs 5.4.4, 5.4.5, 5.4.6, and 5.4.7:

5.4.4 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 a construction trade newspaper (as that term is defined in the *Construction Act*) and shall provide to the *Consultant* and the *Owner* a copy of the published notice, 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.

- 5.4.5 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 maintenance manuals;
 - .8 samples;
 - .9 existing reports and correspondence from *Authorities Having Jurisdiction* in the *Place of the Work*;
 - .10 *As-Built Drawings*; and
 - .11 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 municipal, governmental, and utility *Authorities Having Jurisdiction* in the *Place of the Work*.
- 5.4.6 Where the *Contractor* is unable to deliver the documents and materials described in paragraph 5.4.5, 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 5.4.5.7 or 5.4.5.8, 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 5.5 - PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK. Should any documents or materials not be delivered in accordance with paragraph 5.4.5 by the earlier of sixty (60) 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 5.7.1 of General Condition 5.7 – FINAL PAYMENT, then the amount previously retained pursuant to this provision shall be forfeit 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.
- 5.4.7 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*.

SC 42. GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

1. Add new subparagraph 5.5.1.3 as follows:

5.5.1.3 Submit a statement that no written notices of lien have been received by it.

2. Delete “statement” from paragraph 5.5.2 and replace with the following:
“documents”
3. Delete paragraphs 5.5.3, 5.5.4 and 5.5.5 in their entirety.

SC 43. GC 5.7 FINAL PAYMENT

1. Delete paragraph 5.7.1 in its entirety and replace with the following:

5.7.1 When the *Contractor* considers that the *Work* has been totally performed, the *Contractor* shall submit an application for final payment, together with a written application for review by the *Consultant* to establish *Total Performance of the Work*. The *Contractor’s* application for final payment shall be accompanied by any documents or materials not yet delivered pursuant to paragraph 5.4.5 and, for purposes of the Construction Act, the remaining *Work* is valued at less than \$5,000.

Should the *Contractor* fail to deliver any of the foregoing documents, the *Owner* shall be at liberty to withhold from amounts otherwise payable to the *Contractor* as security for the obligation of the *Contractor* to deliver the undelivered documents. The *Contractor* shall have no right to receive payment of the amount so withheld until such time as all required documents and materials referenced in paragraph 5.4.5 have been delivered.

2. Delete paragraph 5.7.2 in its entirety and replace with the following:

5.7.2 The *Consultant* will, no later than ten (10) *Working Days* after the receipt of an application from the *Contractor* for final payment, review the *Work* to verify the validity of the application and:

- .1 advise the *Contractor* in writing that the *Work* is not totally performed and give reasons why, or
 - .2 state the date of *Total Performance of the Work* in a certificate and Consultant to issue a copy of that certificate to each of the *Owner* and the *Contractor*.”
3. Delete “5 calendar days” in paragraph 5.7.4 and replace with:
“twenty (20) *Working Days*”.
4. Add new paragraph 5.7.5 as follows:

5.7.5 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 44. GC 5.10 LIENS

1. Add new general condition GC 5.10 LIENS as follows:

5.10.1 In the event that a construction lien arising from the performance of the *Work* is registered against the *Project* lands, the *Contractor* shall, within ten (10) calendar days, at its sole expense, vacate or discharge the lien from title to the premises. If the lien is merely vacated, 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.

5.10.2 In the event that the *Contractor* fails or refuses to vacate or discharge a construction lien within the time prescribed above, the *Owner* shall, at its option, be entitled to take all steps necessary to vacate and/or discharge the lien, and all costs and expenses incurred by the *Owner* in so doing (including, without limitation, legal fees on a solicitor and client basis and any payment which may ultimately be made out of or pursuant to security posted to vacate the lien) shall be for the account of the *Contractor* and the *Owner* may deduct such amounts from amounts otherwise due or owing to the *Contractor*. If the *Owner* vacates the lien, it shall be entitled to retain all amounts it would be required to retain pursuant to the *Construction Act* (Ontario) if the lien had not been vacated.

5.10.3 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*.

5.10.4 This GC 5.10 does not apply to construction liens claimed by the *Contractor*.

SC 45. GC 6.2 CHANGE ORDER

1. Add new paragraph 6.2.3 as follows:

- 6.2.3 The value of a change shall be determined in one or more of the following methods as directed by the *Owner*:
- .1 by quotation and acceptance of a lump sum, and all quotations must contain an itemized and complete breakdown of costs, including hours and hourly rates of labour, payroll burden, itemized costs of materials, quantity of materials, *Products*, invoices from subtrades and other receipts and all other costs to perform the change in the *Work*, including the mark-up disclosed below, such that the quotations are capable of being evaluated by the *Consultant*. The *Contractor* shall require *Subcontractors* and *Suppliers* to supply similar information to the *Consultant*.
 - .2 by unit prices set out in the Bid Form or subsequently agreed upon by the parties. Unit prices shall include materials, labour, equipment, delivery, freight, handling, disposal, statutory charges, supervisions, testing, all applicable duties, brokerage charges, import charges, HST, bonding, *Overhead*, profit and all relative charges and expenses including, but not limited to, office administration charges such as disbursements, travel costs, printing and incidentals to the *Contractor*, and shall be the total cost to the *Owner*. Adjustment to the *Contract Price* shall be based on a net quantity difference from the original quantity.
 - .3 by the amount, net of all credits, of time, materials, *Construction Equipment* and *Products* expended:
 - .1 by a *Subcontractor* applying its labour charge out rates, together with the actual costs, without mark-up, of materials, *Construction Equipment* and *Products* utilized in the change, plus the *Subcontractor's* mark-up at 5% which applies to materials, *Construction Equipment* and *Product* costs only;
 - .2 by the *Contractor* applying its labour charge out rates, together with the actual costs, without mark-up, of materials, *Construction Equipment* and *Products* plus the mark-up at 5% which applies to material, *Construction Equipment* and *Product* costs only;
 - .3 the *Contractor* shall be entitled to the *Contractor* mark-up of 5% on both *Contractor's Own Forces* the value of *Subcontractor Work* even where the *Subcontractor* is not entitled to a mark-up on its labour charge out rates pursuant to paragraph 6.2.3.3(1).
 - .4 the mark-ups described in paragraphs 6.2.3.1 and 6.2.3.3 include all necessary supervision, general account items, general clean-up, small tools, *As-Built Drawings* and job safety necessary to perform the change. Additional bonding cost is excluded from the mark-ups but may be included as a cost, using the value declared for bonding by the *Contractor* in its bid to the *Owner*, unless otherwise agreed by the parties.

SC 46. GC 6.3 CHANGE DIRECTIVE

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

6.3.6.3 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 6.3.7.1 in its entirety and replace with the following:

- 6.3.7.1 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*.
3. Delete “and hand tools not owned by the workers” from subparagraph 6.3.7.5 and replace with the following:
“exclusive of hand tools”
4. Add to the end of subparagraph 6.3.7.9, the following:
“, 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”
5. Add to the end of subparagraph 6.3.7.17, the following:
“not caused by the *Contractor* or anyone for whom it is responsible”
6. Delete “thereof when requested” from paragraph 6.3.9 and replace with the following:
“upon submission of any claim for costs related to the *Change Directive*”
7. 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.”
8. Add after “proposed adjustment in the *Contract Time* from paragraph 6.3.12, the following:
“and/or *Contract Price*”

SC 47. GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

1. Add new paragraph 6.4.5, 6.4.6 and 6.4.7 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*.

- 6.4.6 To the extent the *Contractor* has not investigated as referenced in paragraph 6.4.5, the *Contractor* willingly assumes responsibility for all losses, damages, costs, expenses (including all legal costs on a full indemnity basis), liabilities, claims, actions, and demands, whether arising under statute, contract or at common law, which such investigations might have avoided or reduced and shall indemnify and save harmless the *Owner* from all risk which might make it more onerous and more expensive to fulfill or perform the *Work* than was contemplated or known when the *Contract* was signed, and for any and all liability, responsibility and obligations which the *Owner* may have to any third parties resulting from any failure to investigate.
- 6.4.7 If the finding made pursuant to paragraph 6.4.2 is that the subsurface or otherwise concealed physical conditions differ materially and this would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, and if the said conditions were otherwise discoverable by the *Contractor* in the proper performance of its duties and obligations under the *Contract*, all costs and expenses resulting from any delay (excluding, for clarity, the direct cost of remediating the said conditions) in the completion of the *Work* that is caused, or contributed to, as a result of the said conditions, will be borne by the *Contractor*.

SC 48. GC 6.5 DELAYS

1. Delete paragraph 6.5.1 in its entirety and replace with the following:
 - 6.5.1 Subject to the next sentence, 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 except for the town's regulatory function and acting as authority having jurisdiction and the action or omission is contrary to the provisions of the *Contract Documents*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* and *Owner* may recommend in consultation with the *Contractor*. Any delay resulting from the *Contractor* not obtaining or being delayed in obtaining a permit from the *Owner* acting as a regulator authority shall not be considered an action or omission of the *Owner* or anyone employed or engaged by the *Owner* directly. 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. 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.”
3. 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.

2. Add new paragraph 6.5.6 as follows:

6.5.6 If the *Contractor* is delayed in the performance of the *Work* by an act or omission of the *Contractor*, any *Subcontractor* or *Supplier*, or anyone employed or engaged by them, directly or indirectly, or by any cause within the *Contractor's* control, the *Contractor* shall devote such additional resources and take all steps necessary, all at the *Contractor's* own cost and expense, to ensure that the dates for attaining *Substantial Performance of the Work* and *Total Performance of the Work* under the *Contract* as may have been amended in accordance with the provisions of Part 6 of the General Conditions – CHANGES IN THE WORK, are met. If the *Contractor* fails to attain *Substantial Performance of the Work* or *Total Performance of the Work* as aforesaid, the *Owner* shall be reimbursed by the *Contractor* for all reasonable costs, damages and expenses incurred by the *Owner* as the result of any such failure, including, but not limited to, the cost of all additional services required by the *Owner* from the *Consultant* or any subconsultants, project managers, or others employed or engaged by the *Owner*.

SC 49. 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 50. 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 paragraph 7.1.2 in its entirety and replace with the following.
7.1.2 If the *Contractor* neglects to prosecute the *Work* properly or otherwise fails to comply with the requirements of the *Contract* in a material way and if the *Consultant* and the *Owner* agree that sufficient cause exists to justify such action, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, give the *Contractor Notice in Writing* that the *Contractor* is in default of the *Contractor's* contractual obligations and instruct the *Contractor* to correct the default in the five (5) *Working Days* immediately following the delivery of such *Notice in Writing*.
3. 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.
4. Delete paragraph 7.1.6 in its entirety and add new paragraphs 7.1.6, 7.1.7, 7.1.8, 7.1.9, 7.1.10 and 7.1.11 as follows:
7.1.6 The *Owner* has the right to terminate the *Contract* for willful or persistent violation by the *Contractor* or its workers or *Subcontractors* it has engaged for the performance of the *Work* for such violations including, but not limited to the following:
 - .1 failure to provide the schedule when due,
 - .2 failure to commence the *Work* by the date provided in the *Agreement* or other such date as agreed between the parties in writing,
 - .3 failure to comply with the terms and conditions of the *Contract* to a material degree,
 - .4 failure to comply with the *Specifications* and *Drawings* as provided,
 - .5 violation of applicable relevant Acts or legislation (e.g. Occupational Health and Safety Act legislation and regulations, Workplace Safety and Insurance Board Act, and Regulation 309 of the Environmental Protection Act), or
 - .6 failure to maintain the critical path established in the schedule.
7.1.7 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.

7.1.8 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 and for loss sustained upon *Products* and *Construction Equipment*, 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 7.1.7 shall apply.

- 7.1.9 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.
- 7.1.10 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.
- 7.1.11 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 51. GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

1. Delete paragraph 7.2.2 in its entirety.
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 arbitration or court, except where the *Owner* has a bona fide claim for set-off, or
 - .2 the *Owner* violates 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 delivery 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* 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 and for loss sustained upon *Products* and *Construction Equipment*, 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.
5. Add new paragraph 7.2.6 as follows:

7.2.6 If the *Contractor* stops the *Work* or terminates the *Contract* in accordance with this GC 7.2 – CONTRACTOR’S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall leave the *Place of the Work* and the *Work* in a secure condition.

SC 52. GC 8.1 AUTHORITY OF THE CONSULTANT

1. Delete last sentence of 8.1.3 “If it is subsequently determined that such instructions were in error or at variance with the *Contract Documents*, the *Owner* shall pay the *Contractor* costs incurred by the *Contractor* in carrying out such instructions which the *Contractor* was required to do beyond what the *Contract Documents* correctly understood and interpreted would have required, including costs resulting from interruption of the *Work*” and substitute the following sentence:

“If it is subsequently determined that such instructions were at variance with the *Contract Documents*, the *Owner* shall pay the *Contractor* costs incurred by the *Contractor* in carrying out such instructions which the *Contractor* was required to do beyond the requirements of the *Contract Documents*, including costs resulting from interruption of the *Work*.”

SC 53. GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION

1. Delete paragraphs 8.2.6, 8.2.7 and 8.2.8 in their entirety.
2. Add new paragraph 8.2.6 as follows:

8.2.6 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 8.2.5, 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.

SC 54. GC 9.1 PROTECTION OF WORK AND PROPERTY

1. Delete “property adjacent to the *Place of the Work*” in paragraphs 9.1.1 and 9.1.3 and 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. 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.
4. Add new paragraph 9.1.6 as follows:

9.1.6 The *Contractor* shall be responsible for securing the *Place of the Work* at all times and shall take all reasonable precautions necessary to protect the *Place of the Work*, its contents, materials (including *Owner*-supplied materials) and the public from loss or damage during and after working hours.

SC 55. GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

4. Add new subparagraph 9.2.5.5 as follows:

9.2.5.5 Take all reasonable steps to mitigate the impact on *Contract Time* and *Contract Price* and any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials.
2. 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 12.1 – 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 12.1 - INDEMNIFICATION.

SC 56. GC 9.4 CONSTRUCTION SAFETY

1. Delete paragraph 9.4.1 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*.

2. Add new paragraphs 9.4.2, 9.4.3, 9.4.4, 9.4.5, 9.4.6, 9.4.7, 9.4.8, 9.4.9, 9.4.10, 9.4.11, 9.4.12 and 9.4.13 as follows:

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 *Owner's* Corporate Health and Safety Manual, 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 Town of Oakville.
- 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 *Total 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 otherwise *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.
- 9.4.12 In the event of an emergency threatening health, life or property, the *Contractor* shall take such action as may be necessary to save lives and protect persons from injury, and done to protect and preserve the property. The *Contractor* shall notify the *Owner* and the *Consultant* of such emergency as promptly as is practical under the circumstances.
- 9.4.13 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.

SC 57. 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 12.1 – INDEMNIFICATION or that otherwise exist respecting a person or party described in this paragraph.

SC 58. 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 59. GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

1. Delete paragraph 10.2.4 in its entirety and replace with the following:

10.2.4 The *Contractor* shall give the required notices and comply with the laws, ordinances, rules, regulations, or codes which are or become in force during the performance of the *Work* and which relate to the *Work*, to the environment, to the preservation of the public health, and to construction safety. The *Contractor* shall provide the *Owner* with copies of all such required notices and related health and safety documents. The *Contractor* shall notify the Chief Building Official or the registered code agency, where applicable, of the readiness, substantial completion, and completion of the stages of construction set out in the Ontario Building Code. The *Contractor* shall be present at each site inspection by an inspector or registered code agency. If any laws, ordinances, rules, regulations, or codes conflict, the more stringent shall govern.
2. Add to the beginning of paragraph 10.2.5, the following:

“Subject to paragraph 3.4.1,”
4. Delete paragraph 10.2.5 in its entirety and replace with the following:

10.2.5 The *Contractor* shall not be responsible for verifying that the *Contract Documents* are in compliance with the *Applicable Laws*, ordinances, rules, regulations, or codes relating to the *Work*. If the *Contract Documents* are at variance therewith, or if, subsequent to the time of bid closing, changes are made to the *Applicable Laws*, ordinances, rules, regulations, or codes which require modification to the *Contract Documents*, the *Contractor* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known, and no further work on the affected components of the *Contract* shall proceed until these changes to the *Contract Documents* have been obtained by the *Contractor* from the *Consultant*. The *Consultant* will make the changes required to the *Contract Documents* as provided in GC 6.1 - OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.

SC 60. 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 *Owner*”

SC 61. 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 to the beginning of paragraph 10.4.2, the following:

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

3. Add new paragraph 10.4.3 as follows:

10.4.3 Where a *Subcontractor* is not required to participate in the insurance plan provided for under the workers' compensation legislation, the *Contractor* shall require the *Subcontractor* to provide a sworn declaration of its exemption as a condition of the *Subcontractor's* admission to the *Place of Work*. When requested by the *Owner*, the *Contractor* shall require the *Subcontractor* to provide a letter of exemption under the workers' compensation legislation.

SC 62. GC 11.1 INSURANCE

- .1 Add new subparagraph 11.1.1.6(4):

11.1.1.6.(4) If any loss occurs involving damage to property in an amount greater than \$25,000, bodily injury to any person, or damage to any existing structure, the *Contractor* shall, in addition to the other requirements set out herein, immediately provide a detailed written report to the *Owner*.

- .2 Delete paragraph 11.1.2 in its entirety and substitute with the following:

11.1.2 Each of the policies of insurance shall also contain a provision requiring not less than 30 days' written notice to each named insured prior to cancellation or any change that would reduce coverage. At least 10 calendar days prior to commencement of the *Work* and upon any renewal, amendment, or extension of all or any part of the insurance, the *Contractor* shall promptly provide the *Owner* with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements applicable to the *Work*.

- .3 Add new subparagraph 11.1.9:

11.1.9 The parenthetical reference in CCDC 41 - INSURANCE REQUIREMENTS, paragraph 4 which reads: "(excluding flood and earthquake)" is deleted and replaced with the following: "(including flood, earthquake, testing, and *Commissioning*)".

SC 63. GC 11.2 CONTRACT SECURITY

1. Delete paragraph 11.2.1 in its entirety and replace with the following:

11.2.1 The *Contractor* shall, prior to commencement of the *Work*, provide to the *Owner*:

- .1 a performance bond, in the form and the amount set out in the bid documents, covering the performance of the Contract, including the *Contractor's* requirements with respect to the correction of deficiencies and the fulfillment of all warranties; and
 - .2 a labour and material payment bond, in the form and the amount set out in the bid documents, covering payment for labour, *Products*, or both.
2. Delete paragraph 11.2.2 in its entirety and replace with the following:
- 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.
3. Add new paragraph 11.2.3 as follows:
- 11.2.3 If approved changes pursuant to the *Contract* result in approved increase or cumulative increases to the *Contract Price* the *Contractor* shall, if requested in writing to do so by the *Owner*, promptly acquire additional Performance and Maintenance bonding at the *Owner's* expense.

Where additional Performance and Maintenance bonding premiums are paid by the *Owner*, the *Contractor* shall promptly submit written confirmation that the premiums were paid to the surety and promptly provide the *Owner* with the original revised Performance and Maintenance bond(s).

SC 64. GC 12.1 INDEMNIFICATION

1. Delete GC 12.1 INDEMNIFICATION in its entirety and replace with the following:
 - 12.1.1 The *Contractor* shall indemnify and shall defend and save the *Owner*, its elected officials, officers, and employees harmless from and against any claims, proceedings, fines, penalties, expenses and costs (including legal costs on a solicitor and client basis) that are incurred by, or made or instituted against, any of them or to which any of them may be liable by reason of,
 - .1 the *Contractor* carrying out or failing to carry out any obligation to which it is subject, or exercising any right to which it is entitled, under the *Contract* except to the extent that the same are caused by the negligence or deliberate wrongdoing of the *Owner* or other person entitled to indemnification under this GC 12.1, or
 - .2 any patent, trademark, copyright infringement or other breach of any intellectual property right of any person, for which the *Contractor* or any *Subcontractor* to the *Contractor* is responsible.
 - 12.1.2 The right of indemnification granted to the *Owner* or other person entitled to indemnification under paragraph 12.1.1 shall extend to any amount paid by that person in the settlement of any claim against it, and in entering into any such settlement, that person may exercise its reasonable discretion as to the amount to be paid, but that person shall serve prior notice of any intended settlement on the *Contractor*, at least 5 *Working Days* prior to agreeing to any such settlement.

- 12.1.3 The *Owner* may enforce the rights of indemnity conferred on the elected officials, officers, and employees of the *Owner* under paragraph 12.1.1 on their behalf and to the same extent as if they were parties to the *Contract*.
- 12.1.4 The rights to indemnity provided for in this GC 12.1 shall be deemed to be in addition to any rights with respect to insurance in favour of the *Owner*, its elected officials, officers and employees provided under the *Contract Documents*.
- 12.1.5 The rights to indemnity provided for in this GC 12.1 shall survive the expiration or any termination of the *Contract*.

SC 65. GC 12.2 WAIVER OF CLAIMS

1. Delete GC 12.2 WAIVER OF CLAIMS in its entirety.

SC 66. GC 12.3 WARRANTY

1. Add to the end of paragraph 12.3.1 the following:

“, unless the *Contract Documents* otherwise provide.”

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 *Contractor* 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 Where required by the *Contract Documents*, the *Contractor* shall provide to the *Owner* for the duration of the warranty period, a warranty holdback in the amount stated in the *Contract Documents*.
- 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 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 67. PART 13 MISCELLANEOUS

1. Add new PART 13 MISCELLANEOUS as follows:

GC 13.1 OWNERSHIP OF MATERIALS

- 13.1.1 All Work and *Products* delivered and installed at 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 13.2 REVIEW BY OWNER AND REVIEW BY CONSULTANT

- 13.2.1 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 *Contractor* is solely responsible in accordance with the *Contract*.

GC 13.3 USE AND/OR OCCUPATION OF COMPLETED PORTIONS OF THE WORK

- 13.3.1 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*.
- 13.3.2 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. Except where the *Work* was, pursuant to the *Contract Documents*, supposed to have been completed by the time at which the *Owner* desires to occupy and/or use the space or spaces, 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*. If the *Work* was supposed to have been completed by the time of desired occupancy/use, then any extra costs beyond that originally required to complete the *Work* arising from such early occupancy and/or use shall be borne by the *Contractor*.

- 13.3.3 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.
- 13.3.4 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 13.4 CONTRACTOR DISCHARGE OF LIABILITIES

- 13.4.1 In addition to the obligations assumed by the *Contractor* pursuant to General Condition 3.7 – 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 13.5 RECORDS/DAILY REPORTS/DAILY LOGS

- 13.5.1 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 *Subcontractors* and *Suppliers* to incorporate them into every level of contract thereunder for any part of the *Work*.

GC13.6 SET-OFF

- 13.6.1 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.

- 13.6.2 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.

GC 13.7 CONTRACTOR USE OF PERMANENT EQUIPMENT OR SYSTEMS

- 13.7.1 With the prior written approval of the *Owner*, the *Contractor* may make use of elements of the mechanical and electrical systems or equipment comprising a permanent part of the Work for the purpose of providing heat or power to the *Project* during the final stages of construction. In such event, before making its written application for *Substantial Performance of the Work*, and again, immediately prior to final takeover by the *Owner* of such systems and equipment, the *Contractor* shall clean and *Make Good*, to the satisfaction of the *Consultant* and the *Owner*, such systems and equipment as it had been permitted to use. The *Contractor* shall pay any and all costs associated with such use, cleaning and making good.

APPENDIX B
DESIGNATED SUBSTANCE SURVEY REPORT

DESIGNATED SUBSTANCE SURVEY REPORT



Oakville Transit Facility 430 Wycroft Road Oakville, Ontario

Presented to:
Corporation of the Town of Oakville
1225 Trafalgar Road
Oakville, Ontario
L6H 0H3

Attention: Mr. Gary Robinson

December, 2014

Maple Project No. 14478-04

EXECUTIVE SUMMARY

Maple Environmental Inc. ('Maple') was retained by The Town of Oakville to perform a hazardous materials survey for Designated Substances as well as mould and PCBs in the Oakville Transit Facility located at 430 Wycroft Road, Oakville, Ontario (the 'Site').

The findings of the current assessment are summarized below. Please refer to the main body of this report for details on all materials.

Asbestos

No major sources of asbestos-containing materials (ACM) were identified within the building at the time of the assessment. Due to the recent construction (2011), the building is not expected to contain friable asbestos.

Lead

Based on the Laboratory Analysis Report for lead samples and visual confirmation observation made during the fieldwork, no lead-containing paints were identified in the building.

It should also be noted that lead may be present in wiring connectors, electric cable sheathing, solder joints on copper piping, ceramic glazes, lead sheeting, masonry mortar, and as sub-surface layers to the most recent paint layers currently applied, where present at the Site.

Mercury

Mercury vapour is present in all fluorescent lighting tubes.

Mould

No obvious visible mould was observed to be present within the surveyed areas.

Silica

Free crystalline silica, present as common construction sand, is present in all concrete and masonry products where present within the building.

PCBs

The fluorescent lamp fixtures observed all contained T8 fluorescent light tubes. T8 fixtures have electronic ballast and are not considered as PCB-containing.

Recommendations

Asbestos

As no major sources of asbestos were identified (or would be expected to be present based on the recent 2011 construction date) no recommendations are warranted.

Lead

No immediate recommendations are warranted

Paints (and other materials) found with a lead concentration should follow Type I lead abatement procedures, at a minimum, provided that; a) work does not include fume producing activities such as welding, burning, torching, etc., b) is not removed

or demolished by scraping, sanding or striking c) airborne lead concentration are kept below 0.05 mg/m³ and d) general dust suppression and worker protection procedures are utilized including; minimum N95 respirator, protective clothing, and proper worker hygiene. However, it may be prudent that air monitoring be conducted during the disturbance of lead-containing materials to ensure airborne levels of lead do not exceed the acceptable limit.

Mercury

No immediate recommendations are warranted. Follow appropriate procedures if disturbed or removed.

Silica

No immediate recommendations are warranted. Follow appropriate procedures if disturbed or removed.

Mould

No immediate recommendations are warranted.

PCBs

Due to the date of construction (2011), the building is not suspected to contain PCBs.

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APPENDIX I

LABORATORY ANALYSIS REPORT - LEAD

APPENDIX II

DRAWINGS

1.0 INTRODUCTION

Maple Environmental Inc. ('Maple') was retained by The Town of Oakville to perform a survey for Designated Substances as well as polychlorinated biphenyls (PCBs) and mould within the Sixteen Mile Sports Complex located at 430 Wycroft Road, Oakville, Ontario (the 'Site').

Section 30 of the Ontario Occupational Health and Safety Act requires that the following Designated Substances be included in a Designated Substance survey:

Asbestos

Lead

Mercury

Silica

Isocyanates

Vinyl Chloride Monomer

Benzene

Acrylonitrile

Coke Oven Emissions

Arsenic

Ethylene Oxide

Additional detailed information with respect to asbestos was collected at the time of the survey to ensure compliance with Ontario Regulation 278/05.

The assessment was performed by Mr. Matthew Gibbs of Maple on October 29, 2014.

2.0 APPLICABLE ONTARIO REGULATIONS

Applicable Ontario Regulations for each of the materials included in the investigation are briefly described below.

Designated Substances and Other Hazardous Materials

Section 30 of the Occupational Health and Safety Act requires building owners or their agents (architects, general contractors, etc.) to prepare or have prepared a Designated Substance report for specified potentially hazardous materials possibly present in a facility. The owner must ensure that a prospective constructor has received a Designated Substance report before entering into a binding contract with the contractor. The owner is liable to the contractor for damages and costs arising from unreported materials (of which the owner should reasonably have been aware), and could also be subject to orders and fines from the Ministry of Labour.

In addition to the requirements under the Occupational Health and Safety Act, Section 6 of the Ministry of Labour Regulations for Construction Projects requires the contractor, when submitting the Notice of Project form, report any Designated Substances likely to be used, handled or disturbed during the project.

There are no specific Ministry of Labour regulations for control of the other Designated Substances on construction projects. However, the Ministry of Labour actively enforces the general duty clause of the Health and Safety Act which protects workers and provides guidance on exposure monitoring, permissible exposure levels, medical monitoring, etc. for all Designated Substances.

Although Regulations exist for many of the Designated Substances, they apply to industry settings using Designated Substances in manufacturing processes, and do not apply to general property management, renovation or maintenance of buildings.

Polychlorinated Biphenyls ("PCBs") and mould were also included in the investigation, which are not specifically named as Designated Substances. No

specific regulations are attached to these materials, but are generally governed by the due diligence section of the Health and Safety Act for employers to protect their workers.

Ontario Regulation 278/05 (Asbestos)

Ontario Regulation 278/05 applies to buildings with regards to maintenance, renovations or demolition work where asbestos-containing materials (ACM) is present and may be disturbed. The Regulation requires that a detailed asbestos inventory be performed in all buildings where friable and non-friable asbestos materials are present. The inventory must be available at the work place and must identify the type of asbestos, and location of asbestos on a room-by-room basis. The following report meets or exceeds the requirements for an asbestos survey under Ontario Regulation 278/05.

In addition, the regulation requires all buildings where asbestos has been used as part of the building to implement an Asbestos Management Program (AMP).

The major requirements of the AMP include:

- Preparation and maintenance of an on-site record of where asbestos material is located;
- Written notification provided to tenants or lessees occupying space where asbestos is present;
- Advise workers of the owner, other staff and outside contractors of the presence and location of ACM;
- Institute and maintain a program for the training and instruction of every worker employed in the building that is likely to work in close proximity to and may disturb asbestos.
- Update the asbestos report (minimum annually)
- Preparation of written asbestos work practices;
- Repair or removal of all damaged asbestos where it may be disturbed; and
- Other record keeping.

Ontario Regulation 347

Ontario Regulation 347 applies to the transport of waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

The major requirements of the building owner and the person(s) removing the waste are to ensure that:

- The waste is appropriately packaged and labelled;
- The transport vehicle is appropriately placard; and
- The waste is to be transported as directly as possible to the landfill site once it leaves the site.

Some wastes require the owner to register a Generator (of waste) number and many wastes require classification that can restrict or even prohibit their disposal in landfill.

It is important to note that the building owner can be held responsible for the waste until the waste disposal site accepts it.

3.0 SURVEY SCOPE AND METHODOLOGY

The survey was performed on a Room-by-Room basis within the building. The methodology for the major materials included in the assessment and how the assessment was performed is outlined below.

In order to determine the location of materials included in the assessment, the project technologist entered each room, service area, etc. where practical (i.e. where access was possible without the demolition of walls, roof or ceilings or destruction of flooring). Representative views were made above accessible suspended ceiling systems. Cavities within solid ceiling and wall systems were accessed via existing access panels only. The inventory did not include demolition of building systems or finishes to check on possible hidden conditions.

Asbestos-Containing Building Materials (ACM)

The scope of the survey included all friable asbestos products and all major non-friable asbestos materials. The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Asbestos materials that are friable have a much greater potential to release airborne asbestos fibres when disturbed.

Typical friable asbestos materials include: sprayed fireproofing or thermal insulation, textured (stippled) plaster, and thermal mechanical insulation. Typical non-friable materials include: asbestos cement (transite) products, vinyl floor tiles, asbestos textiles and gaskets. Additional materials such as ceiling tiles, drywall joint compounds and vinyl sheet flooring are classified as non-friable, but because of their ability to release dust when disturbed are considered as "potentially friable" for the purpose of this report.

If applicable to the subject building, bulk samples of materials suspected to contain asbestos are collected for analysis during the survey. Specifically, a small volume of material is removed either from a damaged section of suspect material, or taken from intact material. In these latter cases, the material from which the sample is collected is sealed with tape to temporarily prevent fibre release. Samples are placed in plastic bags and sealed until receipt by an independent laboratory. To ensure quality results, the independent laboratory chosen successfully participates in an "Asbestos Proficiency Analytical Testing Program". As such, these independent laboratories are responsible for their findings.

If applicable to the subject building, bulk samples are collected in accordance with regulatory sampling requirements and with sufficient frequency to obtain a general pattern of asbestos use within the building. Due to building renovations or modifications that may have occurred in the past, the consistency of the application of asbestos materials may not be uniform throughout the entire Site. It is important to note that without sampling each individual wall, pipe section, ceiling tile etc. it is not possible to identify the asbestos content of every material present in the building. For this reason, visually similar materials are considered to be homogenous with those already sampled elsewhere in the building without additional analysis.

O. Reg. 278/05 prescribes that a minimum number of samples be collected of materials suspected to contain asbestos. These minimum sampling requirements are summarized in Table 1, below.

Table 1 - Suspect ACM Bulk Sampling Requirements

Type of Material	Quantity of Material Present	Minimum # of Bulk Samples Required
Surfacing Materials (i.e. sprayed fireproofing, drywall joint compound, texture coat, and plaster)	Up to 90 sq. m. (1000 sq. ft.)	3
	From 90 sq. m. (1000 sq. ft.) to 450 sq. m. (5000 sq. ft.)	5
	Greater than 450 sq. m. (5000 sq. ft.)	7
All other potential ACM	Any	3

Excluding surfacing materials, the laboratory was instructed to cease analysis within Sample Groups of homogenous materials when one of the samples in the group is found to contain asbestos. For example, if three samples of a type of vinyl floor tile are collected (as required by O. Reg. 278/05) and submitted for analysis and the first sample is positively identified as containing asbestos, the balance of the sample group is not analysed.

International Asbestos Testing Laboratories ("IATL"), an independent laboratory, was selected to analyse the collected bulk suspect asbestos samples. IATL successfully participates in an "Asbestos Proficiency Analytical Testing Program" and as such, is responsible for its findings. IATL followed the Code of Practice for the identification of asbestos in bulk material, as detailed in O. Reg. 278/05. Bulk samples were analysed using the Polarized Light Microscopy ("PLM") Technique with Dispersion Staining. The identification of asbestos fibre in bulk material is based on a collective set of parameters dependent on the unique shape and crystallographic properties of each fibre as viewed through the microscope. This method is useful for the qualitative identification of asbestos and the semi-quantitative determination of asbestos content in bulk materials expressed as a percent of projected area. The method identifies types of asbestos and also measures percent of asbestos as perceived by the analyst in comparison to standard area projections or trained experience.

The recommendations made as part of this report with respect to asbestos have taken into consideration: the condition and accessibility of the material, vibration, air movement, and general activities likely to occur within the vicinity of the ACM.

Where ACM is found to be in GOOD condition and not likely to deteriorate or fall, the general recommendation would be to re-evaluate the condition of the material on an annual basis (required by O. Reg. 278/05). This recommendation can be subject to change if the material is located in a manner that persons untrained in asbestos awareness could physically damage it.

Where ACM is found to be damaged (i.e. FAIR or POOR condition), a recommendation to have the material cleaned-up, repaired, removed, enclosed, or encapsulated is offered. The recommendation will also indicate which asbestos procedure should be

used to perform the remedial work (i.e. Type 1, Type 2, Type 3, or Glove Bag Removal Methods).

In each area or room inventoried, the technician recorded the quantity and condition (GOOD, FAIR, or POOR) of each suspect material.

The definitions for condition and accessibility items are as follows:

GOOD	Material is intact with no visible signs of damage.
FAIR	Material is visibly damaged but can be repaired.
POOR	Material is damaged beyond repair and likely needs to be removed.

Lead

The investigation included the collection and analysis of all major paint colour applications for the presence of lead in the paint. Other materials that possibly contain lead were identified by known historic use, where relevant. The lead in paint samples were analysed by IATL, using atomic absorption spectrophotometry. IATL is AIHA (American Industrial Hygiene Association) and NIOSH (National Institute of Occupational Safety and Health) accredited for this type of analysis. The Laboratory Analysis Report for lead in paint samples is included with this report as Appendix I.

Mercury

The assessment included a visual identification of fluorescent light tubes, switches, electrical controls, heating system thermostats, thermometers, and other components historically known to contain mercury.

Mould

The assessment for mould was conducted in accordance with standard industry practice as set out in the Canadian Construction Association (CCA) "Mould Guidelines for the Canadian Construction Industry" for a visual assessment. Although there are no regulatory requirements in Ontario for such an assessment, the CCA Guidelines, and similar guidelines from other agencies have been accepted as the industry standard by most experts, consultants, the Ontario Ministry of Labour, and the Canadian Construction Association.

All guidelines and protocols for mould investigations indicate that investigations should be performed largely on a visual basis with limited collection of bulk and/or air samples. The Ontario Ministry of Labour has consistently enforced the removal of all mould from buildings regardless of mould genus or species, and therefore bulk samples or air samples for confirmation of mould are not typically collected for investigative purposes where mould is visible.

Polychlorinated Biphenyls

Manufacturers labels/codes collected from fluorescent lamp ballasts suspected of containing Polychlorinated Biphenyls ("PCBs") are compared with Environment Canada's document titled "Identification of Lamp Ballasts Containing PCBs", which identifies PCB-containing ballasts.

Other Materials

Other materials listed in Section 1.0 of this report were identified on a visual basis where present, as part of the current assessment. It should be noted that no manufacturing or heavy industrial activities are known by Maple to occur at the Site. Therefore, Designated Substances associated with these activities (i.e. those other than Asbestos, Lead, Mercury, and Silica) would not be expected to be present at the subject facility.

Limitations and Omissions from Scope

Due to the nature of building construction some limitations exist as to the possible thoroughness of any building materials inventory. The field observations, measurements, and analysis are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. Maple warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the inventory.

It is possible that conditions may exist which could not be reasonably identified within the scope of the inventory or which were not apparent during the Site investigation. Maple believes that the information collected during the investigation concerning the property is reliable. No other warranties are implied or expressed.

During a standard ACM inventory performed for the purposes of regulatory compliance, it is industry practice to exclude certain suspect asbestos-containing materials from sampling. These materials are often excluded from sampling due to the risk of compromising the health and safety of the technician, other building occupants, or the integrity of the systems with which these materials are associated. Examples of such materials include; elevator brakes, roofing felts and mastics, high voltage wiring, mechanical packing and gaskets, underground services or piping, fire-doors, window caulking and levelling compound. Where observed, these materials were presumed to be ACM.

Drawings

Where present, the drawings indicate sample locations and the location of major applications of asbestos materials with the exception of mechanical insulations (which cannot be accurately depicted on drawings). The information depicted on the drawings is not to scale and is meant to indicate a general representation of the location of asbestos materials.

4.0 INVENTORY FINDINGS

The findings of the survey are presented separately below for each of the eleven Designated Substances as well as microbial growth (mould), and PCBs.

Asbestos

Bulk samples were not collected during the survey as the building is of recent construction (2011) and would not be expected to contain asbestos. Destructive testing was not conducted and as such some areas within the building were not accessible for an assessment (i.e. above ceiling and behind walls). Suspect asbestos materials may be present within these areas that are not identified in this report.

This is particularly important for materials such as non-friable "transite" cement products, suspected to be present within inaccessible areas.

Lead

The following is a brief discussion of the extent to which lead-containing paint was identified in the Site building. The sample numbers refer to the Laboratory Analysis Report presented as Appendix I and summarised in Table 3 below. Two (2) samples were collected for determination of lead content and submitted to the laboratory for analysis.

Table 2 - Summary of Analysis of Lead-in-Paint Samples

Sample No.	Room Name	Sample Description	Result (%)
L-01	Garage	Grey Floor Paint	<0.0021
L-02	Electrical Room	Grey Pipe Paint	<0.0065

Although no regulations currently exist in Ontario, defining the lower limit of lead-containing materials, the EACO Lead Guideline for Construction, Renovation, Maintenance or Repair indicates that paints containing 0.1% lead be considered "lead-containing". Based on this criterion and the results of the sample analysis, lead-containing paint was not identified within the building.

It should be noted that lead may be present in wiring connectors, electric cable sheathing, solder joints on copper piping, ceramic glazes, lead sheeting, masonry mortar, and as sub-surface layers to the most recent paint layers currently applied, where present at the Site.

Mercury

Mercury vapour is present in all fluorescent light tubes and HID lighting.

Mould

No mould amplification sites were observed to be present within the surveyed areas.

Silica

Free crystalline silica, present as common construction sand, is present in all concrete and masonry products where present in the project area.

Polychlorinated Biphenyls

The fluorescent lamp fixtures observed all contained T8 fluorescent light tubes. T8 fixtures have electronic ballast and are not considered as PCB-containing.

Isocyanates

Free isocyanate compounds would not be expected to be found in a non-manufacturing facility.

Vinyl Chloride Monomer

Vinyl chloride monomer would not be expected to be found in a non-manufacturing facility.

Benzene

Benzene would not be expected to be found in a non-manufacturing facility.

Acrylonitrile

Acrylonitrile would not be expected to be found in a non-manufacturing facility.

Coke Oven Emissions

Coke oven emissions would not be expected to be found in a non-manufacturing facility.

Arsenic

Arsenic would not be expected to be found in a non-manufacturing facility.

Ethylene Oxide

Ethylene oxide would not be expected to be found in a non-manufacturing facility.

5.0 RECOMMENDATIONS

Asbestos

As no major sources of asbestos were identified (or would be expected to be present based on the recent 2011 construction date) no recommendations are warranted.

Lead

Paints (and other materials) found with a lead concentration should follow Type I lead abatement procedures, at a minimum, provided that; a) work does not include fume producing activities such as welding, burning, torching, etc., b) is not removed or demolished by scraping, sanding or striking c) airborne lead concentration are kept below 0.05 mg/m³ and d) general dust suppression and worker protection procedures are utilized including; minimum N95 respirator, protective clothing, and proper worker hygiene. However, it may be prudent that air monitoring be conducted during the disturbance of lead-containing materials to ensure airborne levels of lead do not exceed the acceptable limit.

Mercury

Mercury vapour is present in all fluorescent light tubes and HID lighting. All fluorescent light tubes should be handled and disposed of appropriately.

Silica

Free crystalline silica, present as common construction sand, is present in all concrete and masonry products where present in the project area.

Polychlorinated Biphenyls

Due to the date of construction (2011), the building is not suspected to contain PCBs.

6.0 LIMITATIONS

Due to the nature of building construction some limitations exist as to the possible thoroughness of the subject investigation. The field observations are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. Maple warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the assessment.

It is possible that conditions may exist which could not be reasonably identified within the scope of the investigation or which were not apparent during the site investigation. Maple believes that the information collected during the investigation period concerning the property is reliable. No other warranties are implied or expressed.

Information provided by Maple is intended for Client use only. Any use by a third party, of reports or documents authored by Maple, or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Maple accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

The liability of Maple or its staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Maple will not be responsible for any consequential or indirect damages. Maple will only be liable for damages resulting from negligence of Maple; all claims by the Client shall be deemed relinquished if not made within two years after last date of services provided.

Please contact Maple Environmental Inc. at (905) 257-4408 for inquiries regarding this project.

MAPLE Environmental Inc. Environment, Health & Safety Consultants

Prepared By:



**Matthew Gibbs, H.BSc., WRT
Project Technologist**

Reviewed By:



**Brad Panzer
Senior Project Manager**

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APPENDIX I

LABORATORY ANALYSIS REPORT - LEAD

CERTIFICATE OF ANALYSIS

Client: Maple Environmental, Inc.
482 S.Service Rd East,Ste1116
Oakville, ON L6J 2X6

Report Date: 11/10/2014
Report Number: 349643
Project: Oakville Transit Facility
Project No.: 14478

LEAD PAINT SAMPLE ANALYSIS SUMMARY

<u>Lab No.</u>	<u>Client No.</u>	<u>Location / Description</u>	<u>Concentration Lead By Weight (%)</u>
5470524	L01	Grey Paint Garage (Floor)	<0.0021 ***
5470525	L02	Grey Paint Electrical Room (Pipe)	<0.0065

Accreditations:

NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)

AIHA-LAP, LLC No. 100188

NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

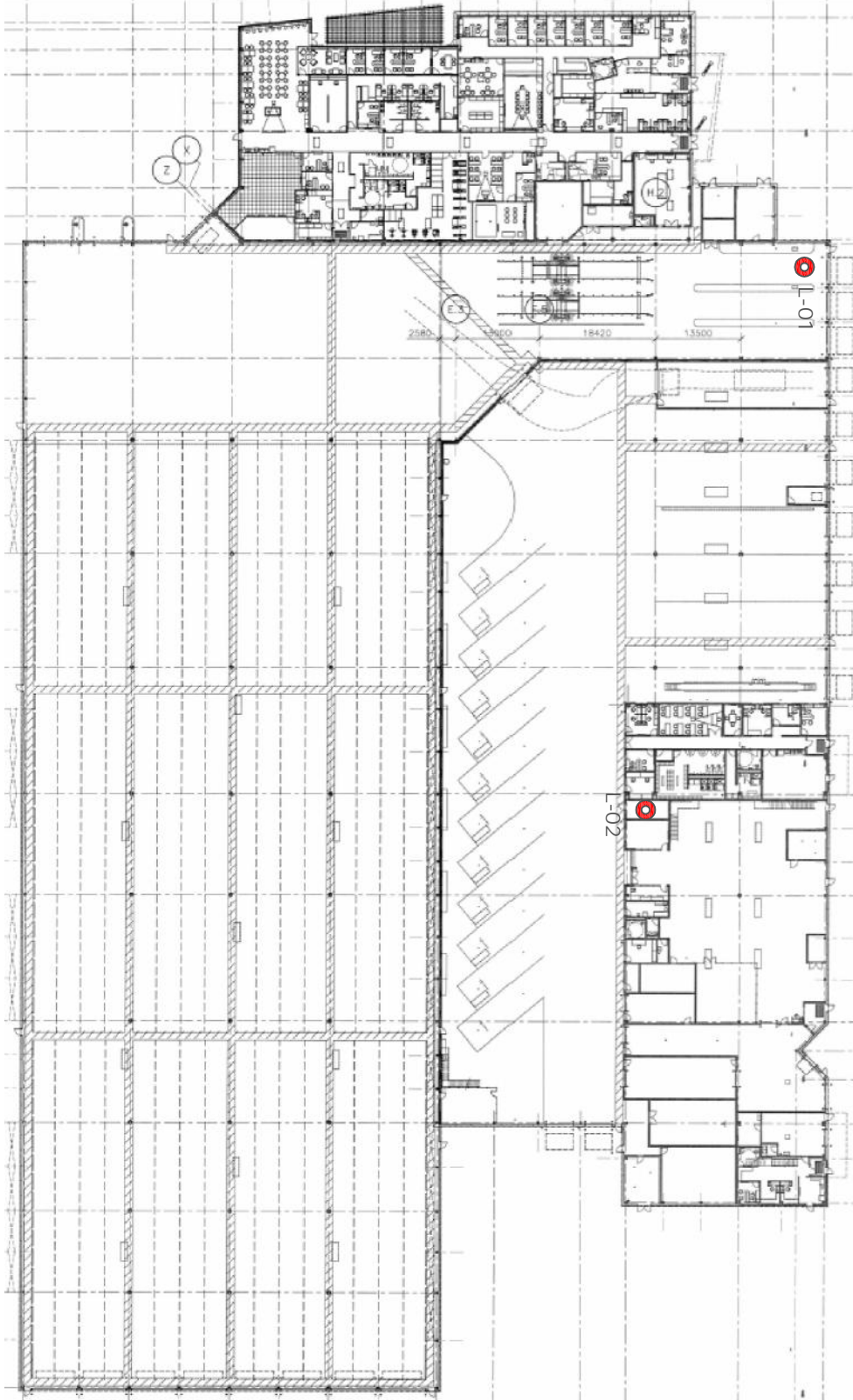
Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Appendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 11/4/2014
Date Analyzed: 11/10/2014
Analyst: C. Shaffer

Approved By: 

Frank E. Ehrenfeld, III
Laboratory Director

APPENDIX II
DRAWINGS



BULK PAINT SAMPLE
14478-04-L-XX

CONFIRMED ACM

NO ACCESS INTO ROOM

Labels Containing Hazardous or Asbestos-like
 Substances are present in the rooms listed below.
 Access and/or Removal with No Access Above
 Ceiling

Drawn By: M. Gibbs
 Check By: E. Blaney
 Project: Oakville Transit Facility
 Location: 430 Wyecroft Road
 Oakville, Ontario

DESIGNATED SUBSTANCE SURVEY

Oakville Transit Facility
 Ground Floor

Project No: 14478-04
 Date: DECEMBER/2014
 Issue: NTS

Sheet: DS-01-01

APPENDIX C
ENLARGED PLAN STORES AREA HVAC

**APPENDIX C IS ATTACHED AS A SEPARATE DOWNLOAD
IN THE ONLINE BIDDING SYSTEM AND FORMS PART OF THIS TENDER.**

DRAWINGS

**DRAWINGS ARE ATTACHED AS A SEPARATE DOWNLOAD
IN THE ONLINE BIDDING SYSTEM AND FORM PART OF THIS TENDER.**