



City of Saint John

TENDER No. 2023-085105T

**Renovations and Elevator Addition –
St. Patrick Street Pedway**

Issue Date: October 30, 2023



City of Saint John

Contract Specifications

TENDER NO.

2023-085105T



City of Saint John

CONTRACT SPECIFICATIONS

FOR

TENDER NO.

2023-085105T

OCTOBER 2023



City of Saint John

GENERAL SPECIFICATIONS

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City of Saint John

CONTRACT SPECIFICATIONS

DIVISION 1

PROJECT DESCRIPTION

OCTOBER 2023



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PROJECT DESCRIPTION

1.1 GENERAL DESCRIPTION

The work consists generally of erecting dust proof hoarding and temporary access points into pedway as indicated, building new elevator shaft with new electric elevator as per drawings, refurbishing existing skylight system, removing escalators and building new stairs and extending mezzanine and refinishing existing lobbies as indicated in the documents at the St. Patrick Street Pedway in Saint John, New Brunswick.

1.2 CONTRACT DOCUMENTS

- a) General Specifications, City of Saint John, New Brunswick, with all applicable Divisions as listed in the Table of Contents of the Contract Specifications.

- b) Contract Specifications,
Tender No.: 2023-085105T

Contract: Renovations and Elevator Addition – St. Patrick Street Pedway

- c) List of Drawings

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A110	Ceiling Plans and Floor Finish Plans
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A401	Stair Sections & Details
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M1	Floor Plans – Fire Protection
M2	Floor Plans – Plumbing and Ventilation

M3 Mechanical Specifications

ELECTRICAL

E101 Electrical Demolition Layouts & Legend

E102 Electrical New Layouts & Schedules

1.3 AUTHORIZED ENQUIRIES CONTACT

All inquiries during the procurement phase of this project shall be referred to:
Chris Roberts, SCMP, CPPB
City of Saint John
175 Rothesay Avenue, Saint John, NB
supplychainmanagement@saintjohn.ca



City of Saint John

CONTRACT SPECIFICATIONS

DIVISION 2

INSTRUCTIONS TO TENDERERS AND TENDERING PROCEDURES

OCTOBER 2023



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INSTRUCTIONS TO TENDERERS AND TENDERING PROCEDURES

2.1 TRADE TREATIES AND TENDERING POLICY

2.1.01 Internal Trade Agreements

Tenderers should note that the within procurement is subject to trade agreements including the Canadian Free Trade Agreement and the Atlantic Procurement Agreement and the Agreement on Opening Public Procurement for Quebec and NB.

2.1.02 Tendering Policy

Tenderers should note that the within Procurement shall conform with The City of Saint John “Tendering Policy for Construction Contracts” which is attached hereto as Appendix “A”.

2.2 MATERIAL DISCLOSURES

2.2.01 General

The City makes the following material disclosures with respect to this Request for Tender. While the City has used considerable efforts to ensure the accurate representation of all information in this Request for Tender, including these material disclosures, such information is supplied solely as a guideline for Tenderers. The City does not warrant or guarantee the accuracy of such information, nor is such information necessarily comprehensive or exhaustive. Nothing in this Request for Tender is intended to relieve Tenderers of the obligation to form their own opinions and reach their own conclusions with respect to the matters addressed in this Request for Tender.

2.2.02 Permits Required for Project

Except as stated otherwise in the Tender Document, any and all permits and approvals required by the Authorities having jurisdiction, and arrangements for all inspections of the Work by these Authorities shall be obtained and paid for by the Contractor. The cost of such approvals, permits and inspection shall be included in the Tender Price.

2.2.03 Deemed Examination and Acceptance

Tenderers should note that by submission of a Tender they will be deemed to have examined and accepted the Specifications and Drawings, visited the site, and informed themselves as to existing conditions and limitations.

2.2.04 Availability of Services

The Tenderer shall ascertain from the relevant Authorities the availability of services, including, but not limited to, electricity, sewer, water, telephone, natural gas and transportation to the project and shall ascertain what prior notice each Authority will require for the installation of the service to the project.

2.2 MATERIAL DISCLOSURES (Cont'd)

2.2.05 Tax

- a) Tenderers are advised to make special note of all applicable tax procedures.
- b) The City is required to pay the Harmonized Sales Tax (HST).
- c) The total tendered amount shall include the appropriate taxes on all labour, material and equipment to be incorporated into the Work.
- d) Tenderers shall submit their Tenders on the basis that the total amount of the Tender shall include all taxes for which the City is liable.
- e) Any increase or decrease in costs to the Tenderer due to the changes in such taxes and duties, after the date of the Tender Closing, shall increase or decrease the value of the Contract accordingly.

2.2.06 Performance Guarantees Required Prior to Contract Execution

Within five (5) Working Days following the City's notice of selection, the selected Tenderer shall provide the City with the required Performance Guarantees being a Performance Bond and a Labour and Material Payment Bond, each at fifty percent (50%) of the Tender Price covering the faithful performance of the full Contract. The bonds shall be in favour of *The City of Saint John* and show *The City of Saint John* as obligee; Unless specified elsewhere within the tender documents, the Performance Bond and the Labour and Material Payment Bond shall be in the form prescribed by regulation pursuant to the *Construction Remedies Act*. The Performance Bond and the Labour and Material Payment Bond shall be issued and be compliant with the requirements of the *Construction Remedies Act* whether the value of the Contract is less than the amount of prescribed pursuant to section 83(1) and 83(2) and 84(1) of the *Construction Remedies Act*.

2.2.07 Insurance

Tenders should refer to Division 6 (section 6.8) for details regarding insurance requirements.

2.2 **MATERIAL DISCLOSURES (Cont'd)**

2.2.08 **WorkSafeNB Certificate and Business Corporations Act Certificate**

- a) New Brunswick Tenderers shall provide to the City a WorkSafeNB certificate which confirms proper registration and good standing with WorkSafeNB and a *Business Corporations Act* Certificate which confirms proper registration with the Province of New Brunswick - Corporate Affairs (of which the Contractor must be in good standing) within five (5) Working Days following the City's notice of selection.
- b) Out-of-province Tenderers shall provide to the City a WorkSafeNB certificate which confirms proper registration and good standing with WorkSafeNB or a letter or certificate issued under the equivalent applicable legislation in the province of origin of the Tenderer confirming extension of coverage from said legislation to the Province of New Brunswick for the term of the Contract. Subject to paragraph c), out-of-province Tenderers shall also provide a *Business Corporations Act* Certificate which confirms proper registration with the Province of New Brunswick - Corporate Affairs (of which the Contractor must be in good standing) within five (5) Working Days following the City's notice of selection.
- c) Tenderers from Nova Scotia may submit the appropriate *Business Corporations Act* Certificate from the Province of Nova Scotia.

2.2.09 **New Brunswick Construction Safety Association**

If the total Tender Price for the work, inclusive of HST, is two hundred and fifty thousand dollars (\$250,000.00) or more, Tenderers shall supply a Letter of Good Standing under the Certificate of Recognition Program from the New Brunswick Construction Safety Association. Out-of-Province Tenderers shall supply an equivalent from the Tenderer's Province of origin acceptable to the Engineer.

2.2.10 **Timetable for Completion of the Work**

The Substantial Completion of the Work is October 31, 2024.

2.3 SCHEDULE FOR THE TENDER PROCESS

Issue Date of Request for Tender	Monday, October 30, 2023
Pre-Bid Site Visit	Monday, November 6, 2023, 3:00 pm, AST
Deadline for Enquiries	Tuesday, November 14, 2023, 4:00:00 pm, AST
Deadline for Issuing Addenda	Wednesday, November 15, 2023, 4:00:00 pm, AST
Tender Closing	Tuesday, November 21, 2023, 2:30:00 pm, AST

The Schedule for the Tender Process is tentative only and may be changed by the City in its sole discretion at any time prior to Tender Closing.

2.4 TENDER DOCUMENTS

2.4.01 Tender Documents to be Obtained in Prescribed Manner

Tender Documents shall be obtained from the City of Saint John’s website under “Tenders and Proposals”.

2.5 COMMUNICATIONS AFTER ISSUANCE OF TENDER

2.5.01 Tenderers to Review Tender Documents

Tenderers shall promptly examine all Tender Documents and:

- a) shall report any errors, omissions or ambiguities; and
- b) may direct enquiries or seek additional information

in writing by email before the Deadline for Enquiries to the Authorized Enquiries Contact or the Designated Alternate Contact (in the event of absence) as set out below. No such communications are to be directed to anyone other than the Authorized Enquiries Contact or the Designated Alternate Contact.

<p><u>Authorized Enquiries Contact</u></p> <p>Chris Roberts, SCMP, CPPB Procurement Manager City of Saint John Email: supplychainmanagement@saintjohn.ca</p>	<p><u>Designated Alternate Contact</u></p> <p>Monic MacVicar, CCLP, CPPB Procurement Specialist City of Saint John Email: supplychainmanagement@saintjohn.ca</p>
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It is the Tenderer's responsibility to seek clarification from the City on any matter it considers unclear. The City shall not be responsible for any misunderstanding on the part of the Tenderer concerning this Tender or its process.

The City intends to confirm receipt of a Tenderer's communication by way of an email in reply. If a Tenderer has not received a reply, the Tenderer may wish to resend its communication as the lack of reply may have resulted from a technical problem. The City is under no obligation to respond to enquiries or provide additional information but may do so at its sole discretion.

2.5 COMMUNICATIONS AFTER ISSUANCE OF TENDER (Cont'd)

2.5.02 Email Communication

The following provisions shall apply to any communications with the Authorized Enquiry Contact or the Designated Alternate Contact by email where such email communication or delivery is permitted by the terms of this Tender:

- a) The City does not assume any risk or responsibility or liability whatsoever to any Tenderer:
 - (i) for ensuring that any email system being operated for the City is in good working order, able to receive transmissions, or is not engaged in receiving other transmissions such that a Tenderer's transmission cannot be received;
 - (ii) if a permitted email communication or delivery is not received by the City, or is received in less than its entirety, within any time limit specified by this Tender; and
 - (iii) for any error that may occur in the submission of communications or enquiries.
- b) All permitted communications submitted by a Tenderer by email to the Authorized Enquiries Contact or the Designated Alternate Contact shall be deemed to have been received on the dates and times indicated on the Authorized Enquiry Contact's or the Designated Alternate Contact's email system

2.5.03 Addenda: Responses to Enquiries and Amendments or Clarifications to Tender Documents

The City may, in its sole and absolute discretion, through the Authorized Enquiry Contact or the Designated Alternate Contact, respond to enquiries and/or amend the Tender Documents before Tender Closing.

Written Addenda are the only means of responding to enquiries or amending the Tender Documents. Only the Authorized Enquiry Contact or the Designated Alternate Contact, and no other employee or agent of the City, is authorized to respond to enquiries and amend the Tender Documents by issuing an Addendum.

Responses to enquiries, changes, clarifications or corrections prepared and circulated by the City form part of the Tender Documents and will be issued as Addenda. Responses will be made in writing and distributed by email to all Tenderers who are registered on the City's official bidders list in accordance with the procedure outlined in section 2.4.01 b) above, as of the date the response is prepared by the City. Each Addendum will contain a signature page(s) which each Tenderer is required to sign and include with its Tender submission. While the City will make reasonable efforts to deliver each Addendum to all Tenderers, it makes no guarantee of timely delivery of any Addendum to any Tenderer.

2.5.03 Addenda: Responses to Enquiries and Amendments or Clarifications to Tender Documents (Cont'd)

The City will not identify the source of the question in the response. If a Tenderer requests that an enquiry be treated as confidential, the City, in its sole discretion, will either treat the enquiry or any reply as confidential or inform the Tenderer that it will not respond to the enquiry unless the Tenderer withdraws in writing its request that the enquiry be treated as confidential.

Orally communicated information shall not be binding upon the City. Information offered from sources other than the Authorized Enquiry Contact or the Designated Alternate Contact with regard to the content, intent or interpretation of this Tender is not official, may be inaccurate and should not be relied on in any way, by any Tenderer, for any purpose.

2.6 SUBMISSION OF TENDER

2.6.01 Location of Tender Box for the Submission of Tender

City of Saint John
175 Rothesay Avenue, 1st Floor
Saint John, New Brunswick

2.6.02 Tenders Must be Submitted Only in the Prescribed Manner

- a) Tenders must be submitted in the prescribed *Form of Tender* together with the prescribed *Schedule of Quantities and Unit Prices*. The *Form of Tender* and the *Schedule of Quantities and Unit Prices* shall be filled out in ink or typewritten and bear the signature in longhand.
- b) Tenderers must submit one completely filled out original *Form of Tender* signed by an authorized representative and should include the following information written on the outside of the sealed envelope:
 - (i) Tender No.: 2023-085105T
 - (ii) Title of Work: Renovations and Elevator Addition – St. Patrick Street Pedway
 - (iii) The full legal name and return address of the Tenderer; and
 - (iv) Tender Closing date and time.
- c) Each Tender shall be accompanied by a Tender (Bid) Bond or certified cheque in the amount of ten percent (10%) of the Tender Price.
- d) Each Tender must be sealed and be addressed to the attention of the Purchasing Agent, City of Saint John, 1st Floor, 175 Rothesay Avenue, Saint John, New Brunswick, E2J 2B4.
- e) All Tenders shall include a surety consent letter or agreement to bond as per the requirements in the Form of Tender.

2.6 SUBMISSION OF TENDER (Cont'd)

2.6.03 Contingency Allowance

The Tender Price shall include the contingency allowance as specified in the *Schedule of Quantities and Unit Prices*, to cover additional costs that may occur during the execution of the Contract attributed to approved additional work not originally contemplated. No part of this allowance shall be expended without the written direction of the Engineer, and any part not so expended shall be deducted from the contingency allowance.

2.6.04 Tenders Must be Placed in the Tender Box Before Tender Closing

It is the responsibility of each Tenderer to ensure that its Tender is placed in the Tender Box before Tender Closing. Tenders submitted by fax or by any other electronic transmission will not be considered.

Tenders submitted after Tender Closing will be deemed late, Disqualified and returned to the Tenderer unopened. For the purpose of calculating time, the City clock at the location of the Tender Box shall govern.

The City is not responsible for any Tender that has not been placed in the Tender Box by the Tenderer. The City assumes no responsibility for improperly addressed or delivered Tenders, Tenders that are left outside of the Tender Box, or sent by electronic transmission.

2.6.05 Amending or Withdrawing Tender Prior to Tender Closing

At any time prior to Tender Closing, a Tenderer may amend or withdraw a submitted Tender by placing an amending letter signed by the person who signed the Tender in a sealed envelope in the Tender Box before the Tender Closing.

The amending letter should clearly specify that the Tenderer intends to withdraw its Tender or, in the case of an amendment, clearly indicate the part of the Tender that the amending letter is intending to replace. In the case of a unit price contract, the amending letter shall show the revision to the Tender Price. In the case of a lump sum contract, the amending letter shall state the amount to be added or subtracted from the Tender Price.

The sealed envelope should clearly state the full legal name of the Tenderer, as well as the Tender No., Title of Work, and Tender Closing date and time as stated in section 2.6.02 b).

Amending letters that are left outside of the Tender Box, or sent by mail, by facsimile, electronically, or by other means will not be considered.

2.6.06 Tenderers Shall Bear the Costs of Preparing and Submitting a Tender

Under no circumstances will the City be responsible for a Tenderer's costs of preparing or submitting a Tender.

2.6 SUBMISSION OF TENDER (Cont'd)

2.6.07 Tenders in English

All Tenders are to be in English only. Any Tenders that are not entirely in the English language may be disqualified.

2.6.08 Tender Acceptance Period

Tenders submitted before Tender Closing shall remain open to acceptance in the form submitted by the Tenderer for a period of sixty (60) calendar days after Tender Closing. Failure of the Tenderer to keep the Tender open for sixty (60) calendar days will result in the enforcement of the Tender (Bid) Bond or the cashing of the certified cheque submitted in lieu of the Tender (Bid) Bond pursuant to section 2.6.02 c).

2.6.09 Tender Documents Incorporated Into Tender

By submission of a Tender, a Tenderer is deemed to have accepted and incorporated all the instructions and terms and conditions contained in the Tender Documents into its Tender. Submission of a Tender shall also confirm that the Tenderer is satisfied as to the correctness and sufficiency of the Tender, the Tender Price and the prices entered in the *Schedule of Quantities and Unit Prices*.

2.7 AMENDMENT OR WITHDRAWAL OF TENDER POST TENDER CLOSING

2.7.01 No Amendment Post Tender Closing

No Tenderer is permitted to amend or withdraw its Tender after Tender Closing. A Tenderer who discovers an error in the Tender after Tender Closing may leave the Tender as is or request permission from Common Council to withdraw its Tender. A request to withdraw a Tender after Tender Closing must be delivered, along with the reasons for the request, to the City Clerk for consideration by Common Council within twenty-four (24) hours of Tender Closing.

2.7.02 Withdrawal Requests

Common Council, in its sole discretion, will decide whether or not to grant the withdrawal request based on the information supplied by the Tenderer and a recommendation from City staff. Where Common Council, in its sole discretion, decides to not allow the withdrawal, Common Council may require the Tenderer to perform the Contract or forfeit the Tender (Bid) Bond or the certified cheque submitted in lieu thereof pursuant to section 2.6.02 c).

2.8 TENDER EVALUATION PROCESS

2.8.01 Delivery of Tender Box to Tender Opening Room

Immediately following Tender Closing, the Purchasing Agent shall deliver the Tender Box to the tender opening room where it will be opened by the Tender Opening Committee. **Tenderers who are on the official bidders list shall receive a Microsoft Teams invitation to view the opening online.**

2.8.02 Tender Opening Process

All Tenders shall be removed from Tender Box, opened, evaluated pursuant to Section 2.8.03, then read and recorded by the Tender Opening Committee in public at the Tender Opening Location. The Tender Opening Committee shall open each Tender individually. Tenders submitted by Tenderers who are not registered on the City's official bidders list according to the procedure outlined in section 2.4.01 b) will not be evaluated. The Tender Opening Committee will conduct the evaluation of the Tenders in two stages.

2.8.03 Stage 1: Evaluation of Mandatory Requirements

Stage 1 will consist of a review to determine which Tenders comply with all of the mandatory requirements. Tenders which do not comply with all of the mandatory requirements set out below, shall be Disqualified and not evaluated further.

Tenders shall be deemed as not complying with the mandatory requirements where:

- a) The Tender is not in a sealed envelope which bears on its face the full legal name and address of the Tenderer, the Tender number, Title of Work and Tender Closing date and time.
- b) The Tender is illegible or its pricing terms or conditions cannot be understood by the Tendering Opening Committee.
- c) Where it is a Tender for more than one item and where it is required that all items be bid, there is a failure to bid an item or it does not contain a unit price or extended total of all items to be bid.
- d) The Tender contains a bid on an item not included in the *Schedule of Quantities and Unit Prices*.
- e) The Tender does not contain the total tender price, the unit prices or the fixed price written in words or does not have the words "dollars" and, where applicable, "cents" set out in the written total tender price, unit prices or fixed price on the *Schedule of Quantities and Unit Prices*.
- f) The Tender is not accompanied by the required Tender (Bid) Bond or certified cheque pursuant to section 2.6.02 c).
- g) The Tender does not include a fully completed prescribed Form of Tender, signed by an authorized agent, which bears the Tenderer's corporate seal, pursuant to section 2.6.02 a) and Division 4.

2.8.03 Stage 1: Evaluation of Mandatory Requirements (Cont'd)

- h) The Tender does not include all required documents specified in the Form of Tender, does not comply with the provisions of the Tender Documents, or does not include the signature page(s) of all addenda issued to the Tenderers signed by the Tenderer.
- i) The Form of Tender contains a change in price that is not initialed by the person signing the Form of Tender.
- j) The Tender contains an unsolicited alternative or a qualification to the terms of the Tender Documents.
- k) Where a Tenderer submits more than one Tender in response to the Request for Tender, all such Tenders shall be Disqualified.

Tenders which are Disqualified by the Tender Opening Committee will be returned to the Tenderer at the address contained in the Tender or in person if the Tenderer is present at the Tender Opening. Tender Prices of Disqualified Tenders will not be announced at the Tender Opening.

2.8.04 Stage 2: Evaluation of Tender Price

Stage 2 will consist of a recording of the Tender Prices by the Tender Opening Committee.

2.8.05 Selection of the Successful Tenderer

At the conclusion of Stage 1 and Stage 2 of the evaluation process and, subject to the approval of selection by Common Council and the reserved rights of the City, the selected Tenderer will enter into the Contract, as set out in the Tender Documents.

2.9 NOTICE OF SELECTION AND EXECUTION OF CONTRACT

2.9.01 Selection of Tenderer

Notice of selection by the City to the selected Tenderer will be in writing. Within five (5) Working Days following the City's notice of selection, the Tenderer shall provide to the City:

- a) those items listed at section 6.8.04 ("Insurance Policies and Certificates");
- b) an executed Form of Agreement (Division 5); and
- c) the required Performance Guarantees pursuant to section 2.2.06

This provision is solely to the benefit of the City and may be waived by the City at its sole discretion.

2.9 NOTICE OF SELECTION AND EXECUTION OF CONTRACT (Cont'd)

2.9.02 Over-Budget Bids

If the Tender Price of the lowest compliant Tender exceeds the City's project budget or the Engineer's estimate for the Project, the City may proceed with negotiations with the lowest compliant Tenderer. Said negotiations shall be conducted within a prescribed timeframe to identify changes in scope and/or quantities of work, in exchange for a corresponding bid price reduction. Where the City and lowest compliant Tenderer establish acceptable changes and a corresponding bid price reduction, those changes shall be documented as post-bid addendum.

Any such negotiations or resulting recommendations shall be conditional and subject to the approval of Common Council and, in accordance with the Limitation of Liability and Waiver set out in section 2.12 below, there shall be no liability resulting from any failure to award a contract.

Where acceptable changes and a corresponding bid price reduction cannot be successfully negotiated with the lowest compliant Tenderer, the City may proceed with a new tender call at a later date.

2.9.03 Failure to Enter Into the Contract

In addition to all of the City's other remedies, such as the enforcement of the Tender (Bid) Bond, if a selected Tenderer fails to execute the Contract, or satisfy any of the applicable conditions set out above at section 2.9.01 within five (5) Working Days of the notice of selection, the City may, in its sole and absolute discretion and without incurring any liability rescind the selection of the Tenderer and proceed with the selection of the next lowest compliant Tenderer.

2.10 CONFIDENTIAL INFORMATION AND MEDIA COMMUNICATIONS

2.10.01 Tenderer's Confidential Commercial Information

The City is committed to an open and transparent Tendering Process while understanding the Tenderers' need for protection of confidential commercial information. To assist the City in meeting this commitment, Tenderers will cooperate and extend all reasonable accommodation to this endeavour.

2.10.02 Tenderer Not to Communicate With Media and Public

To ensure that all public information generated about the Work is fair and accurate, and will not inadvertently or otherwise influence the outcome of the Tendering Process, all public information generated in relation to the Work, including communications with the media and the public, must be coordinated with, and is subject to the prior approval of, the City.

2.10.02 Tenderer Not to Communicate With Media and Public (Cont'd)

Tenderers will notify the City of requests for information or interviews from the media.

Tenderers will ensure that all of the Tenderers' Subcontractors and others associated with the Tenderer comply with the foregoing requirements.

2.11 RESERVED RIGHTS

The City reserves the right to:

- a) Reject an unbalanced Tender. For the purpose of this section, an unbalanced tender is a tender containing a unit price which deviates substantially from, or does not fairly represent reasonable and proper compensation for the unit of work bid or one that contains prices which appear to be so unbalanced as to adversely affect the interests of the City. The City reserves the right to use tenders submitted in response to this Request for Tender or for other like or similar work as a guideline in determining if a bid is unbalanced.
- b) Amend or modify the scope of the Work, and/or cancel or suspend the Tender award, at any time for any reason;
- c) Require Tenderers to provide additional information after the Tender Closing to support or clarify their Tender;
- d) Not accept any or all Tenders;
- e) Not accept a Tender from a Tenderer who is itself, or whose principals, owners or directors are also principals, owners or directors of another entity which is, involved in litigation, arbitration or any other similar proceeding against the City;
- f) Reject any or all Tenders without any obligation, compensation or reimbursement to any Tenderer or any of its team members;
- g) Withdraw this Request for Tender and cancel or suspend the Tendering Process;
- h) Extend, from time to time, any date, any time period or deadline provided in this Tender (including, without limitation, the Tender Closing), upon written notice to all Tenderers;
- i) Assess and reject a Tender on the basis of:
 - (i) information provided by references;
 - (ii) the Tenderer's past performance on previous contracts;
 - (iii) the information provided by a Tenderer pursuant to the City exercising its clarification rights under this Tendering Process;
 - (iv) the Tenderer's experience with performing the type and scope of work specified including the Tenderer's experience as a general contractor;
 - (v) other relevant information that arises during this Tendering Process

2.11 **RESERVED RIGHTS (Cont'd)**

- j) Waive formalities and accept Tenders which substantially comply with the requirements of this Request for Tender;
- k) Verify with any Tenderer or with a third party any information set out in a Tender;
- l) Disqualify any Tenderer whose Tender contains misrepresentations or any other inaccurate or misleading information;
- m) Disqualify any Tenderer who has engaged in conduct prohibited by the Tender Documents;
- n) Disqualify any Tenderer who is guilty of an offence listed in Schedule C of the New Brunswick Regulation 2014-93 under the Procurement Act;
- o) Disqualify any Tenderer for documented significant or persistent deficiencies in fulfilling or performing a substantive requirement or obligation under a prior contract or contracts. The disqualification for past performance shall be conducted in accordance with sections 64 thru 81 of the New Brunswick Regulation 2014-93 under the Procurement Act;
- p) Make changes, including substantial changes, to the Tender Documents provided that those changes are issued by way of addenda in the manner set out in these Instructions to Tenderers;
- q) Select any Tenderer other than the Tenderer whose Tender reflects the lowest cost to the City;
- r) Cancel this Tendering Process at any stage, for any reason;
- s) Cancel this Tendering Process at any stage and issue a new Request for Tender for the same or similar deliverables;
- t) Accept any Tender in whole or in part; or
- u) Accept a Tender which contains the following errors:
 - (i) error in mathematics – whether this involves the extension of a unit price or an error in addition, the mistake will be corrected and the correct total will be used for evaluation purposes and will be binding on the Tenderer.
 - (ii) conflict between the written and numerical bid prices. In all cases, the total bid price will be corrected to reflect the written bid price, whether lump sum or unit price.
 - (iii) failure to include the contingency allowance in the total Tender Price. If the contingency allowance was not included in the addition, the Tender Price shall be corrected to reflect its inclusion.

and these reserved rights are in addition to any other express rights or any other rights which may be implied in the circumstances and the City shall not be liable for any expenses, costs, losses or any direct or indirect damages incurred or suffered by any Tenderer or any third party resulting from the City exercising any of its express or implied rights under this Request for Tender.

2.11 RESERVED RIGHTS (Cont'd)

By submitting a Tender, the Tenderer authorizes the collection by the City of the information set out at paragraph 2.11 i) in the manner contemplated in that subparagraph.

2.12 LIMITATION OF LIABILITY AND WAIVER

Each Tenderer, by submitting a Tender, agrees that:

- a) Neither the City nor any of its employees, agents, advisors or representatives will be liable, under any circumstances, for any Claim arising out of this Tendering Process including but not limited to costs of preparation of the Tender, loss of profits, loss of opportunity or for any other Claim; and
- b) The Tenderer waives any Claim for any compensation of any kind whatsoever, including Claims for cost of preparation of the Tender, loss of profit or loss of opportunity by reason of the City's decision to not accept the Tender submitted by the Tenderer, to award a Contract to any other Tenderer or to cancel this Tendering Process, and the Tenderer shall be deemed to have agreed to waive such right or Claim.

2.13 INVOICES

- a) In light of the requirements of Section 169 of the *Excise Tax Act*, R.S.C. 1985, c. E-15, and amendments thereto, the selected Tenderer shall provide to the City properly documented invoices with all requests for payments. This includes a government issued business number and the amount of tax included on the invoice.
- b) Failure to provide properly documented invoices may result in delays in processing payments or outright rejection of the payment request.



City of Saint John

APPENDIX 'A'

TENDERING POLICY FOR CONSTRUCTION CONTRACTS



City of Saint John

TENDERING POLICY FOR CONSTRUCTION CONTRACTS

PREAMBLE

Whereas the City of Saint John seeks to duly represent the public interest in the management of its public tendering process for construction contracts;

And whereas taxpayers/ratepayers have the right to expect the benefits of free and open competition, that is, the best goods and services at the lowest possible prices;

And whereas municipal tendering should duly respect the place of other stakeholders, including vendors and contractors, in the process;

And whereas the values of integrity, effectiveness, due process and efficiency must be inherent in the process;

Common Council establishes this tendering policy for construction contracts.

POLICY AND APPLICABLE STATUTES

Persons and/or companies that submit tenders for construction contracts are deemed to have understood and agreed to the requirements of this policy and all applicable tender documentation, as well as all applicable Municipal by-laws and Federal or Provincial statutes. Applicable federal and provincial statutes include, but are not limited to: the *Canada Competition Act*; the *New Brunswick Procurement Act*; *Construction Remedies Act*; *Local Governance Act* and the amendments thereto.

APPLICATION OF POLICY

The City of Saint John seeks to optimize fair, open and independent competition for municipal construction work and to afford interested and qualified contractors the opportunity to seek the business.

This policy has been established for construction contracts valued in excess of \$100,000 (before HST). The procedures detailed herein shall apply to all publicly advertised tender calls issued on behalf of the City of Saint John for construction contracts, but do not apply to publicly advertised tenders for the supply of goods and/or services or to invited bids or calls for proposal.

The following divisions of tender specifications for construction contracts form part of this policy: *Instruction to Tenderers and Tendering Procedures* (Division 2); *Form of Tender* (Division 4); and *Form of Agreement* (Division 5).

PUBLIC NOTICE OF TENDER/TENDER ADVERTISEMENT

A public notice of tender shall be issued for all construction contracts valued in excess of one hundred thousand dollars (\$100,000). The notice shall state the contract number, a brief description, the date and the time for the closing of tenders, the location of the locked box for receipt of tenders, and the date, time and location of the tender opening.

TENDER DOCUMENTATION

The following documentation shall be provided to those persons or companies who wish to submit a tender, at an appropriate cost as determined by the Chief City Engineer:

1. Division 1: *Project Description* – as determined by the Chief City Engineer or a designate;
2. Division 2: *Instruction to Tenderers and Tendering Procedures* – forming part of this policy;
3. Division 3: *Particular Specifications* - as determined by the Chief City Engineer or a designate;
4. Division 4: *Form of Tender* - forming part of this policy, and including a Certificate of Independent Tender Determination;
5. Division 5: *Form of Agreement* - forming part of this policy;
6. A notice that Division 6: *General Administration of Contract* and Division 7: *Construction of Municipal Services* of the General Specifications apply to all contracts, and that it is the responsibility of the tenderer to familiarize itself with the provisions in Divisions 6 and 7, as well as those of any other division in the General Specifications determined by the Chief City Engineer or a designate to be applicable to the contract; and
7. Applicable contract drawings, as determined by the Chief City Engineer or a designate.



TENDER PROCESSING

Tenders shall be received and processed in accordance with the provisions set out in Division 2: *Instruction to Tenderers and Tendering Procedures*.

TENDER OPENING COMMITTEE

A tender opening committee is hereby established, consisting of a chairman and two members, as follows:

Chair: *Purchasing Agent or a designate*

Member: *Chief City Engineer or a designate*

Member: A member of staff designated by the City Manager

The committee shall proceed in accordance with the provisions set out in Division 2.

TENDER REJECTION AND AWARD OF CONTRACT

The City of Saint John reserves the right to reject any or all tenders, or to accept a tender other than the lowest tender and to accept the tender deemed to be in its best interests, based on evaluation of relevant criteria, including quality, service and price.

Common Council shall make the decision as to whether or not a contract shall be awarded and to whom it will be awarded.

GENERAL SPECIFICATIONS

The Chief City Engineer may, from time to time, revise the technical provisions of the General Specifications to reflect changes in technology, methods or construction industry practices.



City of Saint John

CONTRACT SPECIFICATIONS

DIVISION 3

PARTICULAR SPECIFICATIONS

OCTOBER 2023



SAINT JOHN



**ST. PATRICK STREET PEDWAY –
RENOVATIONS & ELEVATOR ADDITION
CITY OF SAINT JOHN**

Project No. 19-719

Tender Documents
Specification & Schedules

2023 October

ARCHITECT:

MURDOCK & BOYD ARCHITECTS INC.

50 KING STREET, SUITE 200
SAINT JOHN, N.B.
E2L 1G4

TELEPHONE: (506) 646-9200
FACSIMILE: (506) 646-9201
www.architects.nb.ca



2023.10.06

ELECTRICAL:

RSEI CONSULTANTS LTD.

564 PROSPECT STREET
FREDERICTON, NB
E3B 9M3

Tel: (506) 451-0005
tmcdade@rsei.nb.ca



STRUCTURAL AND MECHANICAL SPECS ARE ON THE DRAWINGS

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PART 1 - GENERAL

1.1 References

- .1 National Building Code of Canada (NBC) 2015 including all amendments up to tender closing date.
- .2 New Brunswick Building Code Regulations.
- .3 Occupational Health and Safety Act Revised Statutes of New Brunswick.
- .4 Construction Safety and Industrial Safety regulations made pursuant to the Occupational Health and Safety Act, S.N.B., 1983.
- .5 Fall Protection and Scaffolding Regulations made pursuant to the Occupational Health and Safety Act, S.N.B., 1983.
- .6 National Fire Code of Canada.
- .7 The provisions of all Sections of Division 1 shall apply to each Section of this Project Manual.

1.2 Reference Standards

- .1 Meet or exceed requirements of:
 - .1 contract documents,
 - .2 specified standards, codes and referenced documents.
- .2 Where edition date is not specified, consider that references to manufacturer's and published codes, standards and specifications are made to the latest edition approved by the issuing organization, current at the date of this Specification.
- .3 Reference standards and specifications are quoted in this Specification to establish minimum standards.
- .4 Should the Contract Documents conflict with specified reference standards or specifications the General Conditions of the Contract shall govern.
- .5 Where reference is made to manufacturer's directions, instructions or specifications they shall include full information on storing, handling, preparing, mixing, installing, erecting, applying or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated and written to suit this specific project.
- .6 Have a copy of each code, standard and specification, and manufacturer's directions, instructions and specifications, to which reference is made in this Project manual, always available at construction site.
- .7 Standards, specifications, associations, and regulatory bodies are generally referred to throughout the Project manual by their abbreviated designations. These are:

AISI - American Iron and Steel Institute
ASTM - American Society for Testing of Materials
AWI - Architectural Woodwork Institute
AWMAC- Architectural Woodwork Manufacturer's Association of Canada
CGSB - Canadian General Standards Board
CISC - Canadian Institute of Steel Construction
CPMA - Canadian Paint Manufacturer's Association
CSA - Canadian Standards Association
IAO - Insurer's Advisory Organization
NBC - National Building Code

1.3 Project Manual

- .1 See Section 01 70 00.

1.4 Description of Work

- .1 Erect dust proof hoarding and temporary access points into pedway as indicated. Building new elevator shaft with new electric elevator as per drawings. Refurbish existing skylight system. Remove escalators and build new stairs and extend mezzanine. Refinish existing lobbies as indicated in documents.
- .2 No work to begin on site as described in section 01 03 00.

1.5 Codes

- .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply. The latest edition of all Codes shall apply upon enactment.

1.6 Documents Required

- .1 Maintain at job site, one copy each of following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed shop drawings.
 - .5 Change orders.
 - .6 Other modifications to Contract.
 - .7 Field test reports.

1.7 Work Schedule

- .1 Construction can only take place between April 1 to October 31 2024. The Work must be completed by end of October 31 2024.
- .2 **Provide schedule of work included to achieve required schedule and anticipated progress stages to final completion of the work.**
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by the Consultant and schedule updated by Contractor in conjunction with and to approval of Owner and Consultant.

1.8 Material & Equipment

- .1 Products specified by manufacturer's name, brand name or catalogue reference shall be the basis of the bid and shall be supplied for the Work without exception in any detail, subject to allowable substitutions as specified.
- .2 Where several proprietary products are specified, any one of the several will be acceptable.
- .3 For products specified by reference standards, the onus shall be on the supplier to establish that such products meet reference standard requirements. The Consultant may require affidavits from the supplier, as specified in Article 3 of this Section or inspection and testing at the expense of the supplier, or both, to

prove compliance. Products exceeding minimum requirements established by reference standards will be accepted for the Work if such products are compatible with and harmless to Work with which they are incorporated.

1.9 Progressive Cleaning

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris.
- .2 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .3 Remove waste material and debris from the site and deposit in waste container at the end of each working day.
- .4 Clean exterior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.10 Cost Breakdown

- .1 Before submitting first progress claim submit breakdown of Contract price in detail for approval by Consultant. After approval by Consultant cost breakdown will be used as basis for progress payment.

1.11 Contractor's Use of Site

- .1 Use of site limited to the following:
 - .1 Public access to all commercial and all fire exit doorways, is to be maintained at all times.
 - .2 Materials may be stored in an area as approved by the Owner.
 - .3 Parking is not available on site.
- .2 The following services are available for use by the Contractor:
 - .1 Water
 - .2 Power (small loads only)
- .3 Contractor to provide:
 - .1 Temporary enclosures
 - .2 Own Telephone
 - .3 Washroom Facilities on site, as approved by Owner.
 - .4 Temporary heat for exterior enclosures
- .4 Contractor to make arrangements for connections for electricity, if demand exceeds safe use of Owners power, and telephone as required for temporary use during construction. Location to approval of Owner. Maintain all temporary facilities. See also Section 01510 - Temporary Utilities.
- .5 Do not unreasonably encumber site with materials or equipment.
- .6 Maintain public sidewalks and roads clear of construction materials and debris, as per authorities having jurisdiction.
- .7 Move stored products or equipment which interfere with the operations of the Owner.
- .8 Obtain and pay for use of additional storage or work areas.

1.12 Project Meetings

- .1 See Section 013110 Project Coordination.

1.13 Submittals

- .1 See 01 33 00 Submittals

1.14 Quality Control

- .1 The Owner and the Consultant shall have access to the Work at all times.
- .2 Give timely notice for review if Work is designated for special tests or particular installation.
- .3 The Contractor shall have these samples tested to certify compliance with specifications requirements. Provide test results promptly.
- .4 The Contractor is responsible for any other tests that are required to confirm quality or verify conformance with specifications.
- .5 The Consultant may from time to time request additional tests and the Contractor is to set aside sample and make arrangements with testing company for testing sample. Such testing, if requested, will be paid for by the Owner.

1.15 Setting Out of Work

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.

1.16 Cutting and Patching

- .1 Cut and patch as required to make work fit.
- .2 Make cuts with clean, true, smooth edges.
- .3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work as close as possible, to approval of Consultant.
 - .1 Make good materials, and prepare surfaces and refinish all finished surfaces damaged, marred, replaced, or otherwise remedied in the existing building.
 - .2 Finish new surfaces flush with existing surfaces. Make junctions between existing and new work, or at replaced or remedial Work undetectable under conditions of normal vision. Make surfaces adjacent to one another of the same material, unit sizes, colour, and texture. If this is impossible, make a proposal of intended method of making good for approval, before installation.

1.17 Existing Services

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.

-
- .2 Where unknown services are encountered immediately advise Consultant and confirm findings in writing.
- 1.18 Concealment**
- .1 Conceal pipes, ducts and wiring in wall construction of newly restored areas, except where indicated otherwise.
- 1.19 Alterations, Additions or Repairs**
- .1 Execute work with least possible interference or disturbance to occupants, public and normal use of premises. Arrange with Owner to facilitate execution of work.
- .2 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas used by the public or tenants.
- .3 Where security has been reduced by work of Contract, provide temporary means to maintain security.
- 1.20 Additional Drawings**
- .1 The Consultant may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract documents.
- 1.21 Relics and Antiquities**
- .1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques and similar objects found during course of the work.
- .2 Give immediate notice to Consultant and await Consultant's written instructions before proceeding with work in this area.
- 1.22 Special Places Protection Act**
- .1 Comply with all regulations as applicable to project.
- 1.23 Regulatory Agencies, Safety, Fire Prevention and Protection**
- .1 Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of building.
- .2 General Construction Safety Measures:
- .1 Observe safety measures of the
- .1 National Building Code 2015, Part 8.
- .2 National Fire Code of Canada.
- .3 Provincial Government, including but not limited to the Occupational Health and Safety Act Revised Statutes of New Brunswick, and the Construction Safety and Industrial Safety, regulations made pursuant to the Occupational Health and Safety Act.
- .4 Worker's / Workmen's Compensation Board.
- .2 In case of conflict or discrepancy the more stringent requirement shall apply.
- .3 Maintain clear emergency exit paths for personnel.
- .3 Overloading: Ensure no part of Work or existing structure is subjected to loading that will endanger its safety or will cause permanent deformation.

-
- .4 WHMIS:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada.
 - .2 Have a copy of WHMIS data sheets available at the workplace on delivery of materials.
 - .5 Except where special permission is obtained, maintain clear access on public sidewalks and roads.
 - .6 Maintain walks and roads clear of construction materials and debris, including excavated material. Clean walks and roads as frequently as required to ensure that they are cleared of materials, debris and excavated material.
 - .7 Remove snow and ice from sidewalks as required by the Owner.
 - .8 Fire Safety Requirements:
 - .1 Enforce fire protection methods, good housekeeping and adherence to local and underwriter's fire regulations. Provide UL approved fire extinguishers, and other fire fighting services and equipment except where more explicit requirements are specified as the responsibility of individual Sections.
 - .2 Smoking is not permitted in hazardous areas. Exercise care in smoking in non-restricted areas.
 - .3 Advise the fire chief in the area of Work of any work that would impede fire apparatus response, including but not limited to violation of minimum overhead clearance prescribed by the fire chief, erecting of barricades and digging of trenches.
 - .4 Use only fire resistant tarpaulins and similar protective coverings on-site.
 - .5 Fire Separations:
 - .1 Ensure that fire separations are installed to maintain total integrity and that they are not breached by Work following their installation.
 - .2 Replace fire separations which have suffered a lessening of their required rating during construction.
 - .6 Store volatile waste in approved containers located in a safe ventilated area and remove from premises daily.
 - .7 Ensure nothing subverts the integrity of fire protection provided for the building structure.
 - .8 Coordinate Work of all Sections so that they do not encroach on space required for the fire protection and its installation. Ensure that fire protection damaged during construction is totally replaced.
 - .9 Reporting fires:
 - .1 Know the location of the nearest fire alarm box and telephone, including the emergency phone number.
 - .2 Report immediately all fire incidents to the fire department as follows:
 - .1 Activate nearest fire alarm box, or
 - .2 Telephone
 - .3 Where fire alarm box is exterior to building, the person activating fire alarm box shall remain at the box to direct Fire Department to scene of the Fire.
 - .4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.
 - .10 Flammable Liquids:
 - .1 Handle, store and use flammable liquids to requirements of the National Fire Code of Canada.
 - .9 Environmental Protection:
 - .1 Ensure that pollution and environmental control of construction activities are exercised as required during the Work.

- .10 Safety Document Submission:
 - .1 Prior to commencement of Work and delivery of material on-site, submit to the Consultant, in writing, documentation detailing the methods and procedures to be implemented ensuring adherence to the acts, regulations, codes and policies specified in this paragraph.
 - .2 The Safety document submission must include information detailing the methods and procedures to:
 - .1 ensure the health and safety of persons at or near the Work
 - .2 ensure the measures and procedures of the regulatory agencies specified are carried out.
 - .3 To ensure every employee, self-employed person and employer performing Work under this contract complies with the regulatory agencies specified.
 - .3 Prior to commencement of Work and delivery of material on-site, submit to the Owner, in writing, documentation that the employees working on this project have met training requirements as legislated by the New Brunswick Occupational Health and Safety Act and its Regulations.

END OF SECTION

PART 1 - GENERAL

1.1 Description of Work

- .1 Construct temporary dust proof hoarding and access doors into pedway as indicated on drawings.
- .2 Create temporary elevated scaffolding access, to exterior adjacent parking lot, after hoarding is in place.
- .3 Remove escalators and construct new stair.
- .4 Construct new elevator shaft for new electric elevator.
- .5 Extend upper floor level for access to new elevator shaft.
- .6 Refinish existing areas as indicated in the documents.
- .7 Provide all associative, Mechanical, Electrical and Structural work as required.

1.2 Description of Work in break out price

- .1 Refurbish the skylight system.

1.3 Sequencing of Work

- .1 No work to start that affects the interior, until all material is delivered and stored in a secure facility. This facility(s) is to be provided by the City. Progress payments for stored material will be processed.
- .2 The adjacent parking lot can be used and occupied fenced by contractor for a trailer, storage containers, cranes etc. prior to interior work commencing, with advance notice to the City. The parking lot will be available for the 7 months of the construction schedule if needed.
- .3 The rationale is to limit the downtime of the public access thru the pedway system.
- .4 A construction schedule to be approved by a city representative and the consultant prior to the work commencing.

END OF SECTION

PART 1 - GENERAL

1.1 Cooperation

- .1 Individual contractors for the work of each trade shall carry out and complete their work with every reasonable cooperation with the Owners and the Contractors of all other trades working in the building or on the premises.
- .2 Before the work of each trade commences, the general lines of run and layout of equipment shall be spotted in the building and clearances shall be obtained from the other building trades to make sure there will be no conflict with their work.
- .3 All trade work must keep pace with the general contract work and any trade causing delays and additional expense shall be responsible for such charges.

1.2 Allocation of Responsibility

- .1 Unless otherwise instructed, it shall be the responsibility of the General Contractor to coordinate work of all trades. The responsibility for determining which subcontractor or supplier shall supply labour, material, equipment, services, allowances, protection to complete the work, specified under the various sections, rests solely with the General Contractor.

END OF SECTION

PART 1 - GENERAL

1.1 Requirements Included

- .1 Scheduled preconstruction and progress meetings.

1.2 Related Requirements

- .1 Project Coordination: Section 01 31 10

1.3 Administrative

- .1 Schedule and administer project meetings throughout the progress of the work.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to the Architect and Owner.
- .4 The Contractor will provide a meeting room on Site.
- .5 Preside at meetings.
- .6 Record the minutes. Include significant proceedings and decisions. Identify 'action by' parties.
- .7 Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants, and affected parties not in attendance.
- .8 Representatives of contractor, subcontractor and suppliers shall attend these meetings and shall be qualified and authorized to act on behalf of the party each represents.

1.4 Preconstruction Meetings

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Representatives of the Owner, Architect, Contractor, major Subcontractors, field inspectors and supervisors shall be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include the following:
 - .1 Appointment of official representative of participants in the work.
 - .2 Schedule of work, progress scheduling (Section 01 31 10).
 - .3 Schedule of submission of shop drawings, samples, colour chips, (Section 01 03 00).
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences (Section 01 52 10).
 - .5 Delivery schedule of specified equipment (Section 01 31 10).
 - .6 Site security (Section 01 52 10).
 - .7 Contemplated Change Orders, Change Orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements (CCCA).
 - .8 Owner provided products.
 - .9 Record Drawings (Section 01 70 00).
 - .10 Maintenance Manuals (Section 01 70 00).

- .11 Take over procedures, acceptance, warranties (Section 01 70 00).
- .12 Monthly progress claims, administrative procedures, photographs, holdbacks (CCCA).
- .13 Appointment of inspection and testing agencies or firms (Section 01 45 00).
- .14 Insurances, transcript of policies (CCCA).

1.5 Progress Meetings

- .1 During course of work and two weeks prior to project completion, schedule progress meetings bi-weekly.
- .2 Contractor, major subcontractors involved in work, Architect, and Owner's representative are to be in attendance.
- .3 Notify parties minimum 5 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three days of meeting.
- .5 Agenda to include the following:
 - .1 Review and approval of minutes of previous meeting.
 - .2 Review of work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule
 - .5 Review of off site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress, schedule, during succeeding work period.
 - .9 Review submittal schedules, expedite as required.
 - .10 Maintenance quality standards.
 - .11 Pending changes or substitutions.
 - .12 Review proposed changes for effect on construction schedule and on completion date.

END OF SECTION

PART 1 - GENERAL

1.1 Requirements Included

- .1 Schedule, form content.
- .2 Staged/phased construction.
- .3 Schedule revisions.

1.2 Schedules Required

- .1 Submit the following schedules:
 - .1 Construction progress schedule.
 - .2 Submit schedule for shop drawings and product data.
 - .3 Submittal schedule for samples.
 - .4 Product delivery schedule.

1.3 Format

- .1 Prepare schedule in the form of a horizontal bar chart.
- .2 Provide a separate bar for each trade or operation.
- .3 Provide horizontal time scale identifying the first work day of each week.
- .4 Format for listings: the chronological order of the start of each item of work.
- .5 Identification of listings: by specification subjects.

1.4 Construction Progress Schedule

- .1 Include the complete sequence of construction activities.
- .2 Include the dates for the commencement and completion of each major elements of construction.
- .3 Show projected percentage of completion for each item as if the first day of each month.
- .4 Indicate progress of each activity to date of submission of schedule.
- .5 Show changes occurring since previous submission of schedule:
 - .1 Major changes in scope.
 - .2 Activities modified since previous submission.
 - .3 Revised projections of progress and completion.
 - .4 Other identifiable changes.
- .6 Provide a narrative report to define:
 - .1 Problem areas, anticipated delays, and the impact on the schedule.
 - .2 Corrective action recommended and its effect.
 - .3 The effect of changes on schedules of other prime contractors.

1.5 Submittals Schedule

- .1 Include schedule for submitting shop drawings, product data, samples.
- .2 Indicate dates for submitting, review time, resubmission time, float time, last date for meeting fabrication schedule.
- .3 Include dates when delivery will be required for the Owners= furnished products.
- .4 Include dates when reviewed submittals will be required from the Architect.

1.6 Staged/Phased Construction

- .1 Prepare and submit sub-schedules for each separate stage of work specified in Section 01 32 00.
- .2 Provide sub-schedules to define critical portions of prime concern to master schedule.
- .3 Describe start and stop times, float time, affected other work.

END OF SECTION

PART 1 - GENERAL

1.1 Requirements Included

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Operating and maintenance manuals.
- .4 Record drawings.
- .5 Certificates and transcripts.

1.2 Related Requirements

- .1 Submission of schedules: Section 01 32 00
- .2 Submission of manufacturer's instructions: Section 01 33 00
- .3 Submission of contract closeout documents: Section 01 70 00

1.3 Administrative

- .1 Submit to Architect submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as to not cause delay in the work. Failure to submit in ample time is not considered sufficient reason for an extension of contract time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by the submittals shall not proceed until review is complete.
- .3 Review submittals prior to submission to the Architect. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the work and the contract documents. Submittals not stamped, signed, dated and identified as to the specific project will be returned without being examined and shall be considered rejected. Submittals not complete as required by each section of the work that are returned stamped "revise and resubmit", may warrant costs credited against the contract for additional review services by Consultants.
- .4 Verify field measurements and affected adjacent work are coordinated, prior to making submission.
- .5 Contractor's responsibility for errors and omissions in submission is not relieved by Architect's review of submittals.
- .6 Contractor's responsibility for deviations in submission from requirements of contract documents is not relieved by Architect's review.
- .7 Keep one reviewed copy of each submission on site.

1.4 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 the work. Provide information in the same measure as drawings and specifications.

- .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 the Section under which the adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Adjustments made on shop drawings by the Architect are not intended to change the contract price. If adjustments affect the value of work, state such in writing to the Architect prior to proceeding with the work.
- .4 Make changes in shop drawings as the Architect may require, consistent with contract documents. When resubmitting, notify the Architect in writing of any revisions other than those requested.
- .5 Submit one transparency and six (6) prints of shop drawings for each requirement requested in specification sections and as the Architect may reasonably require.
- .6 Submit six (6) copies of product data sheets or brochures for requirements requested in specification sections and as the Architect may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.
- .7 If upon review by the Architect, no error or omissions are discovered or if only minor corrections are made, the transparency 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 the same procedure indicated above, shall be performed before fabrication and installation work may proceed.

1.5 Samples

- .1 Submit for review samples in duplicate as requested in respective specification sections. Label samples as to origin and intended use in the work.
- .2 Deliver samples prepaid to Architect's business address.
- .3 Notify the Architect in writing, at the time of submission of deviations in samples from requirements of contract documents.
- .4 Adjustments made on samples by the Architect are not intended to change the contract price. If adjustments affect the value of work, state such in writing to the Architect prior to proceeding with the work.
- .5 Make changes in samples which the Architect may require, consistent with contract documents.

1.6 Operation and Maintenance Manuals

- .1 Two weeks prior to substantial performance of the work, submit to the Architect, 1 hard copy of operation and maintenance manuals and one electronic copy.
- .2 Manuals to contain operational information on equipment, cleaning and lubrication schedules, filters, overhaul and adjustment schedules and similar maintenance information. Instructions in this manual shall be in simple language so as to guide the Owner in the proper operation and maintenance of building components.
- .3 Bind contents in a three ring, hard covered, plastic jacketed binder. Organize contents into applicable categories of work, parallel to specification sections.

- .4 In addition to information specified, include the following:
 - .1 Title sheet, labelled "Operation and Maintenance Instructions", containing project name and date.
 - .2 List of names, addresses and phone numbers of subcontractors and suppliers who can effect repair or maintenance on equipment.
 - .3 List of contents.
 - .4 Final shop drawings and product data of equipment.
 - .5 Record drawings of mechanical and electrical installation.
 - .6 Full description of building systems and operation.

1.7 Record Drawings

- .1 Architect will provide two (2) sets of white prints for record drawing purposes.
- .2 Maintain project record drawings and record accurately significant deviations from contract documents caused by site conditions and changes ordered by Architect.
- .3 Mark changes in red.
- .4 The intent is to amend the contract documents where changes have occurred to produce a record set of "As-Builts" documents. Record any and all changes that have been constructed significantly differently from that indicated on all contract documents. Record information such as:
 - .1 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by Change Order or Field Order.
- .5 At completion of project and prior to interim inspection, neatly transfer notations to one clean set of prints. Each drawing shall be marked "As-Built", stamped, dated and signed by Contractor. Architect's stamps shall not appear. Deliver this clean, fully annotated set of prints to Architect for review and transmission to Owner at Interim Inspection.
- .6 Should the Owner, at his own expense, have reproducible copies prepared with all changes recorded on them, the Owner requires the Contractor to sign, stamp and date the reproducible set.

1.8 Certificates and Transcripts

- .1 Immediately after award of contract, submit Workers' Compensation Board status, transcription of insurances and specified bonding.

END OF SECTION

PART 1 - GENERAL

1.1 Fire Department Briefing

- .1 Contractor will coordinate arrangements to be briefed on Fire Safety at their pre-work conference by Fire Chief before any work is commenced. (Fire Chief shall mean the local Municipal Fire Chief).

1.2 Reporting Fires

- .1 Know the location of nearest fire alarm box and telephone, including the emergency phone number.
- .2 Report immediately all fire incidents to the Fire Department as follows:
 - .1 Activate nearest fire alarm box, or
 - .2 Telephone.
- .3 Person activating fire alarm box will remain at the box to direct Fire Department to scene of fire.
- .4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

1.3 Interior and Exterior Fire Protection and Alarm Systems

- .1 Fire protection and alarm system will not be:
 - .1 Obstructed;
 - .2 Shut-off; and
 - .3 Left inactive at the end of a working day or shift without authorization from Fire Chief.
- .2 Fire hydrants, standpipes and hose systems will not be used for other than fire fighting purposes unless authorized by Fire Chief.

1.4 Fire Extinguishers

- .1 Supply fire extinguishers, as scaled by Fire Chief, necessary to protect, in an emergency, the work in progress and the contractors' physical plant on site.

1.5 Blockage of Roadways

- .1 Advise Fire Chief of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by the Fire Chief, erecting of barricades and the digging of trenches.

1.6 Smoking Precautions

- .1 Observe at all times smoking regulations established and enforced by the Owner.

1.7 Rubbish and Waste Materials

- .1 Rubbish and waste materials are to be kept to a minimum.
- .2 The burning of rubbish is prohibited.
- .3 Removal:
 - .1 Remove all rubbish from the work site at the end of the work day or shift or as directed.
- .4 Storage:
 - .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.

- .2 Deposit greasy or oily rags and materials subject to spontaneous combustion in an approved receptacle and remove as required in 1.8.3.1.

1.8 Flammable and Combustible Liquids

- .1 The handling, storage and use of flammable and combustible liquids are to be governed by the current National Fire Code of Canada.
- .2 Flammable and combustible liquids such as gasoline, kerosene and naphtha will be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes, requires the permission of the Fire Chief.
- .3 Transfer of flammable and combustible liquids is prohibited within buildings or on jetties.
- .4 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.
- .5 Flammable liquids having a flash point below 38°C such as naphtha or gasoline will not be used as solvents or cleaning agents.
- .6 Flammable and combustible waste liquids, for disposal, will be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and the Fire Department is to be notified when disposal is required.

1.9 Hazardous Substances

- .1 Work entailing the use of toxic or hazardous materials, chemicals and/or explosives, otherwise creates a hazard to life, safety or health, will be in accordance with the National Fire Code of Canada.
- .2 Obtain from Fire Chief a "Hot Work" permit for work involving welding, burning or the use of blow torches and salamanders, in buildings or facilities.
- .3 When work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers, equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with the level of protection necessary for Fire Watch is at the discretion of the Fire Chief. Contractors are responsible for providing fire watch service for work on a scale established and in conjunction with the Fire Chief at the pre-work conference.
- .4 Where flammable liquids, such as lacquers or urethanes are to be used, proper ventilation will be assured and all sources of ignition are to be eliminated. The Fire Chief is to be informed prior to and at the cessation of such work.

1.10 Questions and/or Clarification

- .1 Direct any questions or clarification on Fire Safety in addition to above requirements to Fire Chief.

1.11 Fire Inspection

- .1 Site inspections by Fire Chief will be coordinated through the Contractor.
- .2 Allow Fire Chief unrestricted access to the work site.
- .3 Co-operate with the Fire Chief during routine fire safety inspection of the work site.
- .4 Immediately remedy all unsafe fire situations observed by the Fire Chief.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- .1 Instructions to Bidders: Section 00010.

1.2 References

- .1 New Brunswick Occupational Health and Safety Act (1983).
- .2 Canadian Hazardous Products Act.

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 - Submittals.
- .2 When requested by the Architect/Engineer, provide copies of the following:
 - .1 Site-specific hazard assessment.
 - .2 Contractor's safety policy.
- .3 Provide name of person designated as Health and Safety Supervisor.
- .4 Provide copies of accident and incident reports.
- .5 Submit valid copy of Contractor's WHSCC coverage prior to commencement of Work.
- .6 Submit copies of reports or directions issued by Federal, Provincial and Municipal health and safety inspectors.
- .7 Provide Material Safety Data Sheets (MSDS) for controlled products specified by the regulations made under the Hazardous Materials Act.

1.4 Compliance Requirements

- .1 Comply with NB Occupational Health and Safety (OHS) Act and its Regulations.

1.5 Authority Having Jurisdiction

- .1 The OHS Act is enforced by the Workplace Health, Safety and Compensation Commission (WHSCC) of New Brunswick.

1.6 Safety Requirements

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial and local statutes, regulations, and ordinances.

1.7 Environmental Requirements

- .1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage and disposal of hazardous materials, and regarding the labelling and provision of MSDS data sheets.

1.8 Health and Safety Supervisor

- .1 Designate an employee who, in addition to their regular duties, will act as Health and Safety Supervisor, and be;
 - .1 Responsible for implementing, enforcing and monitoring health and safety provisions.

1.9 Posting of Documents

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of New Brunswick.

1.10 Correction of Non-Compliance

- .1 Immediately address health and safety non-compliance issues identified by WHSCC, Architect/Engineer, Federal, Provincial and Municipal health and safety inspectors.
- .2 Provide Architect/Engineer with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Architect/Engineer may stop Work if non-compliance of health and safety regulations is not corrected.

1.11 Blasting

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Architect/Engineer.

1.12 Powder Actuated Devices

- .1 Use powder actuated devices only after receipt of written permission from Architect/Engineer.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 Requirements Included

- .1 Inspection and testing, administrative and enforcement requirements.

1.2 Related Requirements

- .1 Submission of samples to confirm product quality: Section 01 33 00
- .2 Material and workmanship quality, reference standards: Section 01 60 10

1.3 Inspection

- .1 The Architect shall have access to the work. If parts of the work are in preparation at locations other than the place of the work, access shall be given to such work whenever it is in progress.
- .2 Give timely notice requesting inspection if work is designated for special tests, inspections or approvals by Architect instructions, or the law of the place of the work.
- .3 If the contractor covers or permits to be covered work that has been designated for special tests, inspections or approvals before such is made, uncover such work, have the inspections or tests satisfactorily completed and make good such work.
- .4 The Architect may order any part of the work to be examined if such work is suspected to be not in accordance with the contract documents. If, upon examination such work is found not in accordance with the contract documents, the Owner will pay the cost of examination and replacement.

1.4 Independent Inspection Agencies

- .1 Independent Inspection/Testing Agencies will be engaged by the Owner for the purpose of inspecting and/or testing portions of work.
- .2 Cost of such services will be borne by the Owner.
- .3 Provide equipment required for executing inspection and testing by the appointed agencies.
- .4 Employment of inspection/testing agencies does not relax the responsibility to perform work in accordance with the contract documents.
- .5 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defects. Correct defects and irregularities as advised by Architect at no cost to the Owner. Pay costs for retesting and re-inspection.

1.5 Access to Work

- .1 Allow inspection/testing agencies access to the work, offsite manufacturing and fabrication plants.
- .2 Cooperate to provide reasonable facilities for such access.

1.6 Procedures

- .1 Notify appropriate agency and Architect in advance of the requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the 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 Rejected Work

- .1 Remove defective work, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the work or not, which has been rejected by the Architect as failing to conform to the contract documents. Replace or re-execute in accordance with the contract documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in the opinion of the Architect it is not expedient to correct defective work or work not performed in accordance with the contract documents, the Owner may deduct from the contract price the difference in value between the work performed and that called for by the contract documents, the amount of which shall be determined by the Architect.

1.8 Reports

- .1 Submit 4 copies of inspection and testing reports promptly to the Architect.
- .2 Provide copies to subcontractor or work being inspected/tested.

1.9 Tests and Mix Designs

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

1.10 Mock-up

- .1 Prepare mock-up for work specifically requested in the specifications. Include for work of all sections required to provide mock-ups.
- .2 Construct in all locations as specified in specific section.
- .3 Prepare mock-up for Consultant review with reasonable promptness and in an orderly sequence, so as not to cause any delay in the work.
- .4 Failure to prepare mock-up 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.
- .5 If requested, the Consultant will assist in preparing a schedule fixing the dates for preparation.

1.11 Mill Tests

- .1 Submit mill test certificates as required of the specification sections.

1.12 Equipment and Systems

- .1 Submit adjustment and balancing reports for mechanical, electrical systems.
- .2 Refer to Division 23 and 26 for definitive requirements.

END OF SECTION

PART 1 - GENERAL

1.1 General Description

- .1 Work Included:
 - .1 Provide all temporary facilities and controls as required for the work including but not limited to: field offices and sheds, temporary utilities, security, temporary barriers, temporary access, temporary safety measures, construction aids, temporary controls.
- .2 Related Work Specified Elsewhere:
 - .1 Ladders, planks, stagings, hoists and similar items normally furnished by the individual trades for their work (except such items shall comply with pertinent safety regulations specified herein).
 - .2 Installation and hookups of permanent utilities.
- .3 Installation, Maintenance and Removal:
 - .1 Perform temporary installations as specified and in accordance with applicable codes and safety regulations.
 - .2 Make temporary connections to existing utility systems with minimum disruption of existing services. Provide alternate service where necessary.
 - .3 Maintain temporary facilities and controls in substantial and safe condition throughout the progress of the work.
 - .4 Maintain temporary facilities and controls as long as necessary for the safe and proper completion of the work. Remove such items as progress of the work permits or as directed by the Architect.

1.2 Field Offices and Sheds

- .1 Furnish a suitable contractor's field office complete with adequate lighting, heating, power, plan table furnishings, telephone and fax.
- .2 Furnish adequate tool and storage sheds required by the work.
- .3 Locations as directed by Owner.

1.3 Temporary Utilities

- .1 Generally:
 - .1 Provide adequate temporary heat, light, power, water, drains and sanitary facilities as required by the work and for the use of all trades.
- .2 Temporary Telephone:
 - .1 Arrange with the Utility Co. and provide and maintain temporary telephone and facsimile service throughout the entire duration of the project.
 - .2 Locate telephone in contractor's field office and make available to the Architect's representative and for all trades employed on the work.
 - .3 Pay applicable Utility Co. charges.
- .3 Temporary Light and Power:
 - .1 Arrange with the Owner's Representative and perform wiring for and provide temporary electrical lighting and power as required by the work.
 - .2 Furnish temporary electrical distribution system and lighting system, adequate for the work, for inspection and for safety.
 - .3 Comply with applicable codes, local bylaws, and regulations.
 - .4 Use permanent power and lighting systems where available for temporary light and power. Guarantee of permanent system shall commence from the date of substantial performance of the work.
 - .5 Inspect temporary wiring, drop cords and extension cables frequently. Remove from site, damaged or

frayed conductors, fittings and appliances.

- .4 Temporary Heating:
 - .1 Use the permanent heating system supplied under the contractor for temporary interior heating, when available and only provided such use will not damage the system or affect its guarantee.
 - .2 Operate heating system as specified and in complete accordance with the manufacturer's instructions.
 - .3 Guarantee period for heating system shall commence from the date of substantial performance of the work.
- .5 Temporary Water:
 - .1 Make arrangements with the Owner for water supply.
- .6 Temporary Sanitary Facilities:
 - .1 Provide temporary, clean and suitable sanitary facilities.

1.4 Security

- .1 Generally:
 - .1 During the entire construction period, comply with the requirements of the conditions specified under this Section for Security, Safety and Fire regulations as well as the requirements pertaining thereto, specified throughout the contract documents.
 - .2 Whenever a conflict occurs between the requirements of this Section and the remainder of the Contract Documents, the more stringent requirements or regulation shall govern.
 - .3 The Owner's "Non-Smoking" regulations shall be adhered to by the contractor and his personnel (ie: No Smoking in Building).
- .2 Safety Hats:
 - .1 Do not allow workmen or visitors on the site without wearing a safety hat, safety eye protection or proper footwear. Maintain on the site a minimum of six (6) approved, clean safety hats for the use of visitors.
- .3 Fire Extinguishers:
 - .1 Furnish and maintain temporary fire extinguishers during the work as required for adequate fire safety and to meet applicable codes and regulations.
- .4 Storage and Rubbish Removal:
 - .1 Remove rubbish daily from the premises between the hours of 17:00 and 07:30 the following day.
 - .2 Remove immediately flammable materials used in packing, empty paint containers and other flammable material.
 - .3 Do not store paints, varnishes and volatile oils in or adjacent to the building.
- .5 Overloading:
 - .1 Do not overload the structure, furnish and install temporary shoring as required.
- .6 Welding Watch:
 - .1 Notify the Owner and pay all costs for the Owner to provide a "welding watch" during all welding operations.

1.5 Barriers/Safety Measures

- .1 Furnish and maintain temporary legal fencing, hoardings, sheeting, shoring, barricades, lights and warning signs as required for safety during the work.
- .2 Comply with the requirements of the N.B. Industrial Safety Code, the NBC and all local bylaws and regulations.
- .3 Provide temporary railings, and shaft protection to protect openings through slabs.

- .4 Provide dust proof partitions as indicated on drawings.

1.6 Construction Aids

- .1 Furnish and maintain temporary scaffolding, hoists, stairs, ladders, runways, derricks, chutes, etc. as required for the proper and safe execution of the work.
- .2 Comply with the N.B. Industrial Safety Code, the NBC and all local bylaws and regulations for all such apparatus and equipment.

1.7 Access and Parking

- .1 Parking Areas: Parking restricted to area of work.

END OF SECTION

PART 1 - GENERAL

1.1 Work Included

- .1 Reference standards.
- .2 Product quality, availability, storage, handling, protection, transportation.
- .3 Manufacturer's instructions.
- .4 Workmanship, coordination and fastenings.
- .5 Existing facilities.
- .6 Whenever products are named in the specification, only products named in the specification or in issued addenda will be acceptable for use on this project.

1.2 Related Sections

- .1 Quality Control: Section 01 45 00

1.3 Reference Standards

- .1 Within the text of the specifications, reference may be made to the following standards:

ANSI	- American National Standards Institute
ASTM	- American Society of Testing & Materials
CGSB	- Canadian General Standards Board
CLA	- Canadian Lumberman's Association
CSA	- Canadian Standards Association
NAAMM	- National Association of Architectural Metal Manufacturers
NBC	- National Building Code
ULC	- Underwriters' Laboratories of Canada
- .2 Conform to these standards, in whole or in part as specifically requested in the specifications.
- .3 If there are questions as to whether any product or system is in conformance with applicable standards, the Architect reserves the right to have such products or systems tested to prove or disprove conformance.
- .4 The cost for such testing will be borne by the Owner in the event of conformance with Contract Documents or by the Contractor in the event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of bids, except where a specific date or issue is specifically noted.

1.4 Quality

- .1 Products, materials, equipment and articles (referred to as products throughout the Specification) incorporated in the work shall be new, not damaged or defective, and of the best quality (compatible with specification) for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to the 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 the quality or fitness of products, the decision rests with the Architect based upon the requirements of the Contract Documents.

- .4 Unless otherwise indicated in the Specification, maintain uniformity of manufacture for any particular or like item throughout the Contract.
- .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.

1.5 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 Architect 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 the event of failure to notify the Architect at commencement of work and should it subsequently appear that work may be delayed for such reason, the Architect reserves the right to substitute more readily available products of similar character, at no increase in contract price.

1.6 Storage, Handling and Protection

- .1 Handle and store products in a manner to prevent damage, adulteration, 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 seals and labels intact. Do not remove from packaging or bundling until required in the 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 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and other weather sensitive materials on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in a heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to the satisfaction of the Architect.

1.7 Transportation

- .1 Pay costs of transportation of products required in the performance of work.
- .2 Transportation cost of products supplied by the Owner will be paid for by the Owner. Unload, handle and store such products.

1.8 Manufacturer's Instructions

- .1 Unless otherwise indicated in the Specification, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify the Architect, in writing, of conflicts between the specification and manufacturer's instructions, so that the Architect may establish the course of action.

- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Architect to require removal and reinstallation at no increase in Contract Price.

1.9 Workmanship

- .1 Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Architect if required work is such as to make it impractical to produce required results.
- .2 Do not employ any unfit person or anyone unskilled in their required duties. The Architect reserves the right to require the dismissal from the site, workers deemed incompetent, careless, insubordinate or otherwise objectionable.
- .3 Decisions as to the quality or fitness of workmanship in cases of dispute rest with the Architect, whose decision is final.

1.10 Coordination

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

1.11 Concealment

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform the Architect if there is a contradictory situation. Install as directed by Architect.

1.12 Remedial Work

- .1 Perform all cutting and remedial work required to make all parts of this work come together.
- .2 Should work performed outside this contract necessitate cutting and/or remedial work to this work, the cost of such work will be the subject of a Change Order issued by the Architect.
- .3 Perform cutting and remedial work using specialists familiar with the materials affected. Perform in a manner neither to damage nor to endanger any portion of work and carry out no cutting or remedial work to the work of other trades.

1.13 Location of Fixtures

- .1 Consider the location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform the Architect of a conflicting installation. Install as directed.

1.14 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 noncorrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the affected specification Section.

- .4 Space anchors within their 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.

1.15 Protection or Work in Progress

- .1 Adequately protect work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Architect, at no increase in contract price.
- .2 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of Architect.

1.16 Existing Utilities

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

END OF SECTION

PART 1 - GENERAL

1.1 Requirements Included

- .1 Final cleaning.
- .2 Systems demonstration.
- .3 Document submission.
- .4 Project commissioning.
- .5 Inspection and takeover procedures.

1.2 Related Requirements

- .1 Submission of record drawings: Section 01 33 00
- .2 Operating/Maintenance Manuals: Section 01 33 00
- .3 Progressive site cleaning: Section 01 45 00
- .4 General Conditions of the Contract: Fiscal provisions, legal submittals, and other administrative requirements.

1.3 Final Cleaning

- .1 When the work is substantially performed, remove surplus products, tools, construction machinery and equipment not required for the performance of the remaining work.
- .2 Remove waste products and debris other than that caused by the Owner, other contractors or their employees, and leave the work clean and suitable for occupancy by the Owner.
- .3 When the work is totally performed, remove surplus products, tools, construction machinery and equipment. Remove waste products and debris other than that caused by the Owner.
- .4 Remove waste materials and debris from the site at regularly scheduled times or dispose of as directed by the Architect. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Leave the work broom clean before the inspection process commences.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .9 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .10 Clean floor finishes, as recommended by the manufacturer, no waxing.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

- .12 Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.

1.4 Systems Demonstration

- .1 Prior to final inspection, demonstrate operation of each system and all other products/materials that require instruction to operate, to Owner's representatives.
- .2 Instruct personnel in operation, adjustment, and maintenance of equipment and systems, using provided operation and maintenance data as the basis for instruction.

1.5 Documents

- .1 Collect reviewed submittals (Section 01 33 00) and assemble documents executed by subcontractors, suppliers and manufacturers.
- .2 Submit material prior to final application for payment. For equipment put into use with Owner's permission during construction, submit within 10 days after start up. For items of work delayed materially beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
- .3 Provide warranties and bonds fully executed and notarized.
- .4 Execute transition of Performance and Labour and Materials Payment Bond to warranty period requirements.
- .5 Submit a final statement of accounting giving total adjusted contract sum, previous payments, and monies remaining due.
- .6 Architect will issue a final change order reflecting approved adjustments to contract sum not previously made.

1.6 Project Commissioning

- .1 Expedite and complete deficiencies and defects identified by the Architect.
- .2 Review maintenance manual contents (operating, maintenance instructions, record "as-built" drawings, spare parts, materials) for completeness.
- .3 Review change orders, holdbacks and other contract price adjustments.
- .4 Submit required documentation such as Statutory Declarations, Workers' Compensation Certificates, Warranties, Certificates of Approval or acceptance from regulating bodies.
- .5 Attend 'end-of-work' testing and break-in or start-up demonstrations.
- .6 Review inspection and testing reports to verify conformance to the intent of the documents and that changes, repairs or replacements have been completed.
- .7 Meet with Architect, Structural, Mechanical and Electrical Consultants, to coordinate completion, testing approvals.
- .8 Review condition of equipment which have been used in the course of the work to ensure turning over at completion in as new condition with warranties, dated and certified from time of substantial performance of the work.
- .9 Arrange and coordinate instruction of Owner's staff in care, maintenance and operation of building systems and finishes by suppliers or subcontractors.

- .10 When partial occupancy of uncompleted project is required by the Owner, coordinate Owner's uses, requirements, access, with contractor's requirements to complete project.
- .11 Coordinate Owner's moving in of staff, furnishings, equipment with building accessibility, traffic, and contractor's and subcontractor cleaning up and completion activities all to suit Owner's work schedule and not disrupt Owner's activities.
- .12 Provide ongoing review, inspection and attendance to building call back, maintenance and repair problems during the warranty periods.

1.7 Inspection/Takeover Procedures

- .1 If the project has been completed in accordance with the terms of the Contract and there are no outstanding deficiencies, a Final Inspection shall be held and a Final Certificate of Performance shall be issued to the Owner by the Architect.
- .2 When the work is substantially complete but there are still outstanding deficiencies, the Owner may accept the building on the basis of a Certificate of Substantial Performance.
- .3 Where the work is taken over on an Certificate of Substantial Performance, the following shall take place:
 - .1 When the Architect determines that the work is close to substantial completion, a review is carried out by the Contractor to list deficiencies to be repaired or reinstated prior to arranging a Review to determine Substantial Performance. At this inspection, the Contractor shall submit to the Architect "As-Built" record drawings for review and presentation to the Owner at Review for Substantial Performance.
 - .2 A date for the Substantial Performance Review shall be agreed upon to permit the Owner to check the work and to add deficiencies which may have been overlooked in previous reviews.
 - .3 Change Orders, which are part of the Contract, must be completed by this date. Any outstanding Change Orders shall be processed at this time.
 - .4 When the Contractor has completed the items reviewed from the first inspection and considers the work substantially completed, the Contractor shall in consultation with the Architect, establish a mutually agreed date and time for the Review for Substantial Performance.
 - .5 Ten days prior to the Review for Substantial Performance, the Contractor will notify, in writing, the following: Architect, Owner, Sub-Contractors and Consultants to the project, that the contract is complete and ready for the Review for Substantial Performance. These parties, or their representative, must be present at this review.
 - .6 During the review, the Architect will prepare a deficiency list.
 - .7 Immediately after the review the Architect, Owner's representatives and the Contractor will determine the amount of money to be held back against repair or restitution of these deficiencies. A completion date shall also be established.
 - .8 If there are too many deficiencies, as determined by the Architect, the Owner's representative may reject this review and request a second review at a later date. The cost associated with arranging for a second review will be borne by the Contractor.
 - .9 Following the review, the Architect shall forward to the Owner confirmation of the inspection, a copy of the Certificate of Substantial Performance with list of deficiencies showing the amount of money held back for each deficiency. Copies shall be sent to the Contractor and Owner.
 - .10 After listed deficiencies are reported as repaired or reinstated, the Architect, Contractor and the Owner shall carry out a further review to confirm total completion. A Final Certificate of Completion will then be issued to the Owner.
- .4 One year following the award of Substantial Performance, a review will be held to confirm the repair or restitution of deficiencies and defects and performance of warrantied items or systems. The Architect will advise the Owner by letter, thirty days in advance of year end, of the time and date for the review. On completion of this review the Architect will report his findings to the Owner with copies to the Contractor.

END OF SECTION

PART 1 - GENERAL

1.1 Submittals

- .1 Provide duplicate notarized copies of warranties called for in the applicable specifications Sections.
- .2 Refer to individual sections of the specifications for specific requirements of the warranties.
- .3 Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
- .4 Provide a Table of Contents and assemble for inclusion in the Operation and Maintenance Manual specified in Section 01 70 00.
- .5 Submit warranties immediately after the issuance of the Certificate of Substantial Performance, to facilitate release of holdback monies.
- .6 For items of work delayed beyond the date of Substantial Performance, provide an updated submittal within ten (10) days after acceptance, listing the date of acceptance as the start of the warranty period.
- .7 If the validity of an extended warranty is related to proper maintenance and servicing of equipment, etc., provide full details in maintenance manuals.

1.2 Maintenance Service

1. Furnish service and maintenance of components indicated in specification sections for the specified time period commencing on the date of Substantial Performance.
2. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
3. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
4. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without the Owner's prior written consent.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Removal of existing construction to permit the construction of the new work. Extent of removals shall encompass everything required to facilitate the creation/construction of what is indicated and intended, as the new work.
- .2 Perform all removal of existing materials and assemblies and make good as indicated on the drawings and specified herein. Making good means restoration to the extent that the new work will be complete and finished in all respects.
- .4 Demolition notes on the drawings are provided to assist in establishing items to be removed to ensure the new work fits. The new work governs and demolition drawing notes and specifications are to be read in conjunction with the new work requirements.

1.2 Related Sections

- .1 Division 1: All Sections

1.3 Codes and Standards

- .1 Carry out demolition work in accordance with Canadian Construction Safety Code (latest edition), provincial and local codes, regulations and requirements of insurance carriers providing coverage for this work.
- .2 Comply with CSA S350-M1980 Code of Practice for Safety in Demolition of Structures.
- .3 Do welding in accordance with CSA W59-1984 unless specified otherwise.

1.4 Protection

- .1 Prevent movement, settlement or damage of adjacent construction. Make good damage and be liable for damage or injury caused by demolition.
- .2 Provide necessary shoring to protect construction adequately during the demolition process.
- .3 Take precautions to support structures and if safety of new or existing construction appears to be endangered, cease operations and notify Architect.
- .4 Provide protection from falling debris. Prevent debris from blocking services, exits, etc.
- .5 Provide protection to interior finishes.
- .6 Provide dust/noise and security protection. Refer to Division 1 requirements.
- .7 Protect existing items designated to remain, to be reinstalled and as noted for salvage.

1.5 Recording of Existing Conditions

- .1 Prior to demolition, take photographs and make notes to indicate existing conditions, to become familiar with the scope of demolition work.
- .2 Obtain signature of Owner's Representative on notes and photographs and submit two sets of copies to Architect/Engineer.

1.6 Restrictions on Dust, Noise

- .1 Comply with requirements of Division 1 to enable continuous occupancy of the facility.

1.7 On-Site Storage of Removal Items

- .1 Store, where directed by Owner, items designated for re-use in the renovation work or for use by the Owner otherwise.

1.8 Fees

- .1 Pay all required fees, including dumping fees. Store, where directed by Owner, items designated for re-use in the renovation work or for use by the Owner otherwise.

PART 2 - PRODUCTS

2.1 Materials

- .1 Unless otherwise specifically approved, use only new, solid lumber, utility grade or better, to construct temporary barricades.
- .2 Materials for Falsework: to CSA S269.1-1975.
- .3 Materials for Scaffolding: to CSA S269.2-M1987.
- .4 Welding Materials: to CSA W59-1984.

PART 3 - EXECUTION

3.1 Preparation

- .1 Prior to beginning work, inspect all areas of the work and identify objects designated to be turned over to the Owner or to be re-used in renovation work.
- .2 Locate services which may be affected by demolition work and provide required protection. Disconnect services as required by the work using qualified tradesman.
- .3 Cooperate with the Owner, provide for continuous occupancy of existing building as specified under Division 1.
- .4 Comply with Dept. of Health regulations.

3.2 Demolition Work

- .1 Demolish and/or remove parts, assemblies and items of existing building as indicated and required, to permit and accommodate the construction and renovation work, and to complete the work of this Contract.
- .2 Remove and protect those items identified for reinstallation in the finished assembly or to be handed to the Owner for use otherwise.
- .3 Provide containers for the collection of demolished materials which will be discarded.
- .4 Remove existing equipment, finished construction, services and obstacles where required for refinishing or making good of existing surfaces to remain exposed and replace as work progresses.

- .5 At end of each day's work, leave work in safe condition so that no part or material is in danger of falling or of causing other hazard. Protect interiors from external elements at all times.
- .6 Demolish to minimize dusting. Provide dust barrier partitions, the purpose of which is to not permit the passage of any dust.
- .7 Carefully remove and lower heavy objects.
- .8 Do not disturb adjacent items and surfaces designated to remain in place, unless required to complete new work.

3.3 Disposal

- .1 Selling or burning of materials on site is not permitted.
- .2 Dispose of all demolished materials not designated for salvage or re-use in the work, off of property. Comply with authorities having jurisdiction.
- .3 Remove all debris from site; leave site in a neat, orderly condition. Tarp all containers.
- .4 Turn items over to the Owner where indicated at site. Comply with Architect/Engineers direction.
- .5 Remove items from building in designated area only or as directed by Architect/Engineer. Provide disposal chutes and dumpsters with suitable tarp coverings only where indicated and/or where approved by Architect/Engineer.

3.4 Miscellaneous Removals and Re-Installation

- .1 Remove all miscellaneous items noted and as required to carry out the work of this and other sections. Take precautions to prevent damage to items being re-installed. Remove fastenings. Patch fastener holes prior to the installation of new finishes.
- .2 Coordinate with Section 09 91 00 for repainting prior to reinstallation where necessary.
- .3 Provide required fastenings. Reinstall unless noted otherwise. Use existing fastener holes where practicable. Drill new holes where required; do not use impact type tools. Reinstall items square, plumb and aligned true to building lines.
- .4 Where noted or specified, turn items over to other trades for reinstallation.

3.5 Removal of Existing Interior Finishes

- .1 Remove existing finishes to extent indicated, and as required by the work. Patch surfaces which will be exposed in finished work and make good.

3.6 Restoration

- .1 Mechanical and electrical disconnection's, removal and reinstallation shall be carried out by their respective trades to the requirements of this Section.

3.7 General Patching and Making Good

- .1 Carry out patching and making good of assemblies and finish surfaces to remain in the completed work. Include all openings and damage caused by demolition work of all trades.
- .2 Blend patching with existing surfaces. Patching shall be better quality workmanship than adjacent surfaces being blended to.
- .3 Patch and restore openings and damage to finish surfaces which will remain exposed in the completed work.

3.8 Reinstallation of Removed Items

- .1 Reinstall existing items as indicated except where specified to be reinstalled under other sections.
- .2 Protect items for reinstallation. Restore finish where damaged. Re-adjust operating parts for correct operation. Modify as required to suit new work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 The work of this Section includes the provision of all labour, materials, equipment and services required to construct unit masonry work, as indicated on the drawings, as specified herein and as required for a complete project.
- .2 Single source responsibility: Engage a qualified masonry firm to assume undivided responsibility for the masonry work specified herein and in the related Division 04 Sections.
- .3 General contractor responsible for required sealants and insulation required at top of masonry partitions as shown on partition types.

1.2 Related Work

- | | | |
|----|--------------------------------------|------------------|
| .1 | Mortar and Masonry Grout: | Section 04 04 05 |
| .2 | Masonry Anchorage and Reinforcement: | Section 04 04 15 |
| .3 | Masonry Units: | Section 04 20 00 |
| .4 | Reinforced Unit Masonry: | Section 04 26 19 |
| .5 | Joint Sealants: | Section 07 92 00 |

1.3 Reference Standards

- .1 CAN/CSA-A5-98, Portland Cement.
- .2 CSA A179-04, Mortar and Grout for Unit Masonry.
- .3 CSA-A371-04, Masonry Construction for Buildings.
- .4 CSA-S104.1-04, Masonry Design for Buildings. (Limit States Design)

1.4 Regulatory Requirements

- .1 The work of this Section shall conform to the requirements of the NBC 2010, latest revision, and all other applicable codes and regulations, to the satisfaction of the authorities having jurisdiction.
- .2 Contractors are required to ensure that the Masonry trade is in accordance with the "Apprenticeship and Occupational Certification Act", Compulsory Occupations, Section 17(2).

1.5 Product Delivery, Storage and Handling

- .1 Deliver materials to job site in dry condition.
- .2 Deliver packaged products in original unopened packaging with legible manufacturer's identification.
- .3 Keep materials dry until use.
- .4 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

- .5 Store roll materials on end in original packaging.
- .6 Store adhesives at temperatures of 5 deg. C and above. Keep solvent away from open flame, spark or excessive heat.
- .7 Protect flexible flashing material from sunlight until ready for use.

1.6 Cold Weather Requirements

- .1 Conform to the applicable requirements of CSA-A371, supplemented by the following:
 - .1 Maintain temperature of mortar between 5°C and 50°C until used.
 - .2 The amount of insulation required to properly cure masonry in cold weather shall be determined on the basis of the expected air temperature and wind velocity (wind chill factor), and the size and shape of the structure.
 - .3 The protection period, shall be increased from 24 to 48 hours unless high, early strength Portland cements, Type 30, in accordance with CSA Standard CAN/CSA-A5, and Type S hydrated lime are used in mortars and grouts. Where Types N and O mortars are used, all protection periods shall be increased by 24 hours.
 - .4 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.

1.7 Hot Weather Requirements

- .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

1.8 Protection

- .1 Until masonry work is completed and protected by flashings or other permanent construction, keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Provide temporary bracing of masonry work, during and after erection, until permanent lateral support is in place.

PART 2 - PRODUCTS

2.1 Materials

- .1 Masonry materials are specified in related Sections indicated in Paragraph 1.2.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine areas and conditions under which work is to be performed and notify the owner in writing of conditions detrimental to the proper and timely completion of the work.
- .2 Do not proceed with the work until unsatisfactory conditions have been corrected to the satisfaction of the installer.

- .3 Take field measurements to verify or supplement dimensions.
- .4 Commencement of the masonry work will be construed as acceptance of the site conditions and, thereafter, the Contractor shall be fully responsible for satisfactory work as specified herein.

3.2 Workmanship

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .3 Lay out coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.3 Tolerances

- .1 Conform to the tolerance requirements of CSA-A371.

3.4 Exposed Masonry

- .1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.

3.5 Jointing

- .1 In exposed masonry work use concave joints. Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints.
- .2 Strike flush all joints concealed in walls and joints in walls to receive tile, insulation, or other applied material, except that where paint or similar thin finish coating is called for, use concave joints as specified for exposed work.
- .3 Provide continuous vertical control joints as indicated.
- .4 Width of joints shall be uniform, both horizontal and vertical joints shall be neatly tooled.

3.6 Joining of Work

- .1 Where necessary to temporarily stop horizontal runs of masonry, and in building corners, step-back masonry diagonally to lowest course previously laid. Do not "tooth" new masonry. Fill in adjacent courses before heights of stepped masonry reach 1200 mm.

3.7 Laying Masonry Units

- .1 Bond for Brick Veneer: Running bond except where otherwise indicated.
- .2 Bond for Concrete Block: Running bond except where otherwise indicated.
- .3 Coursing height:
 - .1 Standard concrete block: 1 block + 1 joint = 200mm.
 - .2 Standard brick: 3 bricks + 3 joints = 200mm.

3.8 Weep Holes and Vents

- .1 Install weep hole tubes in the masonry course immediately above each through-wall flashing at horizontal spacing not exceeding 600 mm o.c. Slope to shed water to the exterior. Keep clean

3.9 Lateral Support and Anchorage

- .1 Comply with NBC Part 4, the contract drawings, and related sections specified in paragraph 3.

3.10 Anchors

- .1 Embed anchors solidly in mortar or grout to develop maximum resistance to design forces.

3.11 Cutting

- .1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects. Align cutouts with each other and plumb and square to surrounding material.
- .2 Make cuts straight, clean, and free from uneven edges. Use a masonry saw wherever possible.

3.12 Building-In

- .1 Build in items required to be built into masonry.
- .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

3.13 Support of Loads

- .1 Use grout to CSA A179 where grout is used in lieu of solid units.
- .2 Install building paper below voids to be filled with concrete or grout; keep paper 1" (25 mm) back from faces of units.

3.14 Provision for Movement

- .1 Leave spaces as follows:
 - .1 30 mm between top of non-loadbearing walls and partitions and structural elements.
 - .2 13 mm at the vertical edge where non-loadbearing walls meet loadbearing walls or other structural elements such as columns.
- .2 Do not use wedges. Fill spaces with soft joint filler and caulk both sides with sealant to match surrounding materials where exposed to sight.

3.15 Masonry Control Joints

- .1 Construct masonry control joints as required.
 - .1 Provide a building paper bond breaker on one side of the joint and fill void between concrete masonry unit with mortar joint filler.
 - .2 Wrap horizontal reinforcing bars with building paper for minimum 400 mm each side of control joint.

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- .3 Rake vertical control joints to a depth of minimum 20 mm and install sealant in accordance with Section 07 92 00.
 - .4 Leave control joints in brickwork open and install sealant joint filler and sealant in accordance with Section 07 92 00.

3.16 Cleaning

- .1 Allow mortar droppings on masonry surfaces to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block or brick and finally by brushing. DO NOT PERMIT MORTAR DROPPINGS ON MASONRY SURFACES TO BECOME HARD BEFORE CLEANING. CLEAN WITHIN MAXIMUM 24 HOURS OF LAYING.
- .2 Upon completion of the work of this Section, remove from the premises all surplus material, dirt and debris caused by the work of this Section and leave the installation clean.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Mortar and grout for masonry.

1.2 Related Work

- .1 Section 04 26 19 - Reinforced Unit Masonry: Installation of mortar and grout.

1.3 References

- .1 CSA-A179-04 - Mortar and Grout for Unit Masonry.
- .2 CSA-A371-04 - Masonry Construction for Buildings.
- .3 CAN/CSA-A3000-03 - Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .4 ASTM C150 - Standard Specification for Portland Cement.
- .5 ASTM C207 - Specification for Hydrated Lime for Masonry.
- .6 CSA-S304.1-04 - Design of Masonry Structures.

1.4 Submittals for Review

- .1 Submit in accordance with Sections 01 00 01.
- .2 Include design mix, indicate whether the Proportion or Property specification of CSA-A179 is to be used, required environmental conditions, and admixture limitations.
- .3 Samples: Submit two (2) samples of mortar, illustrating mortar colour and colour range.

1.5 Submittals for Information

- .1 Submit in accordance with Sections 01 00 01.
- .2 Reports:
 - .1 Submit reports on mortar indicating conformance of mortar to property requirements of CSA A179, component mortar materials to requirements of CSA A179 and test and evaluation reports to CSA A179.
 - .2 Submit reports on grout indicating conformance of component grout materials to requirements of CSA A179 and test and evaluation reports to CSA A179.
- .3 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 Delivery, Storage and Protection

- .1 Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.7 Environmental Requirements

- .1 Cold and Hot Weather Requirements: CSA A371 - Masonry Construction for Buildings.

PART 2 - PRODUCTS

2.1 Materials

- .1 Cementitious Material: CSA A179.
 - .1 Portland Cement: CSA A3001, Type GU, grey colour.
- .2 Mortar Aggregate: CSA A179, fine aggregate.
- .3 Grout Aggregate: CSA A179, fine aggregate.
- .4 Water: Clean and potable.
- .5 Admixtures: VOC compliant, type required to suit mix design.

2.2 Mortar Mixes

- .1 Mortar for Interior and Exterior Above Grade:
 - .1 Loadbearing walls: CSA A179, Type S using the Proportion specification.
 - .2 Non-Loadbearing Partitions: CSA A179, Type N using the Proportion specification.
- .2 Mortar for Exterior Clay Brick Masonry:
 - .1 CSA A179, Type S using the proportion specification.

2.3 Mortar Mixing

- .1 Mix mortar ingredients in accordance with CSA A179 in quantities needed for immediate use.
- .2 Add mortar colour (if specified) and admixtures in accordance with manufacturer's written instructions. Provide uniformity of mix and colouration.
- .3 Do not use antifreeze liquids, calcium chloride, frost inhibitors based on calcium chloride, salts or other substances used for lowering the freezing point or accelerating setting time.
- .4 If moisture is lost by evaporation, retemper with water in quantities and at intervals sufficient to restore workability
- .5 Use mortar within 1 1/2 hours after mixing at temperatures of 25 degrees C or higher, or 2 1/2 hours at temperatures less than 25 degrees C within period specified by mortar manufacturer.

2.4 Grout Mixes

- .1 Bond Beams and Lintels: 21 MPa strength at 28 days; 200-250 mm slump; mixed in accordance with CSA A179.
- .2 Engineered Masonry: 21 MPa strength at 28 days; 200-250 mm slump; mixed in accordance with CSA A179.

2.5 Grout Mixing

- .1 Mix grout in accordance with CSA A179.
- .2 Add admixtures in accordance with manufacturer's written instructions; mix uniformly.
- .3 Do not use antifreeze liquids, calcium chloride, frost inhibitors based on calcium chloride, salts or other substances used for lowering the freezing point or accelerating setting time.

PART 3 - EXECUTION

3.1 Examination

- .1 Request inspection of spaces to be grouted.

3.2 Preparation

- .1 Apply bonding agent to existing surfaces.
- .2 Plug clean-out holes with block masonry units. Brace masonry for wet grout pressure.

3.3 Installation

- .1 Install mortar and grout in accordance with CSA A179.

3.4 Field Quality Control

- .1 Perform testing in accordance with Section 01 00 00 and 01 00 02.
- .2 Test mortar and grout mix in accordance with CSA A179.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Continuous wire reinforcement and reinforcing rods.
- .2 Masonry anchors and ties.
- .3 Section does not include fabrication or installation of welded anchorage to structural steel, but does include for coordination of this. Section does not include the fabrication of loose steel anchorage, but does include for the installation of such.

1.2 Related Work

- .1 Section 04 04 05 - Mortar and Masonry Grout: Mortar and grout.
- .2 Section 04 04 25 - Masonry Units: Unit masonry materials.
- .3 Section 04 26 19 - Reinforced Unit Masonry.

1.3 References

- .1 ASTM A53/A53M-06a - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- .2 ASTM A123/A123M-02 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .3 CAN/CSA-G40.18-M92 (R2002) - Billet-Steel Bars for Concrete Reinforcement.
- .4 CAN/CSA G40.20-04/G40.21-04 - General Requirements for Rolled or Welded Structural Steel/Structural Quality Steel.
- .5 CAN/CSA-G164-M92 (R2003) - Hot Dip Galvanizing of Irregularly Shaped Articles.
- .6 CSA-A370-04 - Connectors for Masonry.
- .7 CSA-A371-04 - Masonry Construction for Buildings.
- .8 CSA G30.3-M1983 (R1998) - Cold-Drawn Steel Wire for Concrete Reinforcement.
- .9 CSA-S304.1-04 - Masonry Design for Buildings.

1.4 Submittals

- .1 Submit in accordance with Sections 01 00 01.
- .2 Product Data: Submit for wire and bar reinforcing supplied by this Section.

PART 2 - PRODUCTS

2.1 Materials

- .1 Steel Wire: CSA G30.3; Minimum 70% post-consumer and 20% pre-consumer recycled content.
- .2 Steel Sections and Plates: CAN/CSA-G40.20/G40.21, Grade 350W. Minimum 75% post-consumer and 9% pre-consumer recycled content.

- .3 Steel Pipe: ASTM A53/A53M, Grade A Schedule 40, standard weight, finish as scheduled.

2.2 Reinforcement

- .1 Refer to Drawings for reinforcement details for all interior and exterior walls.
- .2 Single Wythe Joint Reinforcement: CSA A370, continuous truss or ladder type; cold drawn steel wire.
 - .1 Finish: refer to structural drawings for finish.
 - .2 Wire Size: Minimum 9 gauge unless otherwise indicated on Drawings.
 - .3 Minimum 70% post-consumer and 20% pre-consumer recycled content.
 - .4 Acceptable Manufacturers: Blok-Lok, Dur-O-Wal, Wire Bond.
 - .5 Refer to structural drawings for schedule.
- .3 Double Wythe Joint Reinforcement: CSA A370, continuous truss type; cold drawn steel wire.
 - .1 Finish: refer to structural drawings for finish.
 - .2 Wire Size: Minimum 9 gauge unless otherwise indicated on Drawings.
 - .3 Minimum 70% post-consumer and 20% pre-consumer recycled content.
 - .4 Acceptable Manufacturers: Blok-Lok, Dur-O-Wal, Wire Bond.
 - .5 Refer to structural drawings for schedule.
- .4 Intersecting Concrete Block Walls: At locations where one wall abuts another, reinforcing to be used to tie both walls together. Refer to structural masonry notes for requirements.
- .5 Bar Reinforcing Steel: CAN/CSA-G40.18, Grade 400W, deformed billet bars, uncoated finish; Minimum 70% post-consumer and 5% pre-consumer recycled content.
- .6 Bar Anchors: CSA A370, bent steel shape, hot dip galvanized to ASTM A123/A123M after fabrication.
- .7 Rod and Bolt Anchors: CSA A370, formed steel rods, adjustable, hot dip galvanized to ASTM A123/A123M after fabrication, size as indicated.

2.3 Anchorage to Structural Steel

- .1 Welded Anchorage to structural steel to be provided and installed by 05 50 00 as per structural drawings and specifications with coordination by this section. Loose steel anchorage to be provided by 05 50 00 and installed by this section as per structural drawings and specifications.
- .2 Refer to Structural drawings for additional masonry connectors.

2.4 Fabrication

- .1 Refer to Drawings for typical masonry wall reinforcing details.
- .2 Fabricate reinforcement, anchors, ties and connectors to CSA A370.
- .3 Fabricate bar reinforcing to CSA A23.1-04/A23.2-04.

PART 3 - EXECUTION

3.1 Installation

- .1 Install masonry connections, anchors and reinforcing as indicated in masonry Sections 04 26 16 and 04 26 19 and as shown on the Drawings.
- .2 Field welding of masonry connectors to structural steel to be performed by Licensed Welders certified to CSA W47.1.
- .3 Inspection and testing of masonry anchorage may be carried out by testing laboratory designated by Engineer-Architect. Costs of inspection and testing will be paid by Engineer-Architect.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Concrete block masonry units for reinforced masonry partitions.

1.2 Related Work

- .1 Section 01 00 01 - Project Specific General Requirements
- .2 Section 04 04 05 - Mortar and Masonry Grout.
- .3 Section 04 04 15 - Masonry Anchorage and Reinforcement.
- .4 Section 04 26 19 - Reinforced Unit Masonry.

1.3 References

- .1 CSA A23.1-00/A23.2-00 - Concrete Materials and Methods of Concrete Construction /Methods of Test for Concrete.
- .2 CAN/CSA-A82-06 - Fired Masonry Brick Made from Clay or Shale.
- .3 CSA-A165 Series-04 (R2009) - CSA Standards on Concrete Masonry Units.
- .4 CSA-A371-04 (R2009) - Masonry Construction for Buildings.
- .5 CSA-S304.1-04 (R2010) - Masonry Design for Buildings.

1.4 Submittals

- .1 Submit to Section 01 00 01.
- .2 Product Data: Submit for each masonry unit supplied by this Section.
- .3 Samples: Submit two samples of each unit, installed by this Section, to illustrate colour, texture and extremes of colour range.

PART 2 - PRODUCTS

2.1 Concrete Masonry Units

- .1 Standard Concrete Block Masonry Units (CMU): CSA A165 Series (CSA A165.1), Type H/15/A/M.
 - .1 Standard size: modular 190 mm high x 390 mm long x thickness indicated.
 - .2 Special shapes: Provide bond beam units, bullnose units at exterior corners, and other shapes as indicated.
 - .3 Recycled Content: minimum 20% pre-consumer recycled content.
 - .4 Acceptable Manufacturers: Regional manufacturer located within 800 kms of Project Site. Shaw or approved equal.
 - .5 Special Conditions:
 - .1 Provide bullnosed units at all interior exposed corners, including openings for aluminum doors and windows.
 - .2 Provide for custom bullnosed exterior corners on angled wall assemblies. Fabricate using solid masonry units cut to shape and ground. Provide in stack bond at corners only and maintain running bond for field of walls.
 - .3 Provide bullnose soldier course at base of masonry window openings.

2.2 Fabrication

- .1 Manufacture masonry units to CSA A371 and CSA S304.1.

PART 3 - EXECUTION

3.1 Installation

- .1 Install masonry units as specified in masonry Sections 04 26 16 and 04 26 19.
- .2 See section 01 00 01 for masonry requirements related to mock up.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Installation of concrete masonry units.
- .2 Reinforcement, anchorage, and accessories.

1.2 Related Work

- .1 Section 04 04 05 - Mortar and Masonry Grout.
- .2 Section 04 04 15 - Masonry Anchorage and Reinforcement.
- .3 Section 04 20 00 - Masonry Units.
- .4 Section 07 92 00 - Joint Sealants.
- .5 Mechanical and Electrical Divisions: Supply of access panels.

1.3 Related Work

- .1 Mechanical and Electrical: Supply of access doors; installed this Section.

1.4 References

- .1 CSA A371-04 - Masonry Construction for Buildings.
- .2 CSA S304.1-04 - Design of Masonry Structures.
- .3 CSA W47.1-03 – Certification of Companies for Fusion Welding of Steel Structures.
- .4 ULC (Underwriters Laboratories of Canada) - List of Equipment and Materials for:
 - .1 Building Materials.
 - .2 Fire Resistance.
 - .3 Firestop Systems and Components.
- .5 ASTM E84-07a - Test Method for Surface Burning Characteristics of Building Materials.
- .6 New Brunswick Occupational Health and Safety Act (O.C. 91-1035).
 - .1 General Regulation 91-191.
- .7 New Brunswick Apprenticeship and Occupational Certification Act, Chapter A-9.1.
 - .1 General Regulation 97-125.

1.5 Submittals

- .1 Sections 01 00 00 and 01 00 02: Submission procedures.
- .2 Shop Drawings: Indicate bars sizes, spacings, locations, reinforcement quantities, bending and cutting schedules, supporting and spacing devices for reinforcement, and accessories
- .3 Product Data: Provide data for fabricated wire reinforcement.

- .4 Design Data: Indicate required mortar strength, masonry unit assembly strength in all planes, supportive test data.
- .5 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.6 Quality Assurance

- .1 Perform Work in accordance with CSA A371 - Masonry Construction for Buildings and CSA S304.1 - Design of Masonry Structures.
- .2 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience.
- .3 Perform work in accordance with Contractor's Indoor Air Quality Plan and Waste Management Plan.

1.7 Regulatory Requirements

- .1 Contractors are required to ensure that the Masonry Trade is in accordance with the NB Apprenticeship and Occupational Certification Act, Compulsory Occupations, Section 17(2).
- .2 No person other than a registered apprentice or a person employed during a probationary period shall engage in the bricklayer trade unless they hold a current certificate of qualification or a current special certificate.
- .3 The ratio of apprentices to journeypersons must comply with the Apprenticeship and Trades Qualifications Act General Regulations.
- .4 When requested by the Engineer-Architect, provide proof of compliance with the Act and its Regulations.
- .5 The masonry contractor is to furnish, at the request of the Engineer-Architect, a list of completed projects similar in scope and of equal or more value than this project completed in the last five years.
- .6 Conform to applicable code for fire rated masonry construction.

1.8 Pre-Installation Conference

- .1 Sections 01 00 00: Pre-installation meeting.
- .2 Convene one (1) week before starting work of this section.

1.9 Delivery, Storage and Protection

- .1 Deliver, store, protect and handle products to site.
- .2 Package and protect masonry units to arrive undamaged at the job site.
- .3 Store masonry under waterproof cover on pallets or plank platforms held off ground.

1.10 Environmental Requirements

- .1 Cold and Hot Weather Requirements: CSA A371 - Masonry Construction for Buildings.
- .2 Temporary Indoor Air Quality (IAQ) Controls:

- .1 Isolate work area with plastic sheeting.
- .2 Provide supplementary ventilation exhausted to outdoors.

- .3 Heating and Hoarding: By General Contractor, coordinate installation of temporary utilities and equipment required to maintain specified environmental requirements.

1.11 Coordination

- .1 Coordination erection of masonry assemblies with installation of structural steel anchorage and bracing by Section 05 50 00 and as indicated on Structural Drawings.

PART 2 - PRODUCTS

2.1 Concrete Block Masonry Units

- .1 Standard Concrete Block Units: Specified in Section 04 20 00.

2.2 Reinforcement and Anchorage

- .1 Joint Reinforcement: As Specified in Section 04 04 15.
- .2 Bar Reinforcing Steel: As Specified in Section 04 04 15.
- .3 Angles and Clips: Specified in Section 04 04 15.

2.3 Mortar and Grout

- .1 Mortar and Grout: Type as specified in Section 04 04 05.
- .2 Concrete: in accordance with section 03 30 00.
- .3 Preformed Control Joints: Rubber, neoprene or Polyvinyl chloride material. Provide with corner and tee accessories, cement fused joints.
- .4 Compressible Joint Filler: ASTM 1330, closed cell polyethylene, urethane or neoprene foam rod; oversized 30 to 50 percent larger than joint width; self-expanding; width to suit joint x by maximum lengths.
- .5 Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that field conditions are acceptable and are ready to receive work.
- .2 Verify items provided by other sections of work are properly sized and located.
- .3 Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 Preparation

- .1 Direct and coordinate placement of metal anchors supplied to other Sections.

- .2 Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- .3 Verify that items built-in under other sections are properly located and sized.

3.3 Coursing

- .1 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .2 Establish lines, levels, and coursing indicated. Protect from displacement.
- .3 Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- .4 Concrete Masonry Units:
 - .1 Bond: Running, stack bond and soldier coursing as indicated on Drawings.
 - .2 Vertical Coursing: One unit and one mortar joint to equal 200 mm.
 - .3 Mortar Joints:
 - .1 Exposed Masonry: Concave.
 - .2 Concealed Masonry: Strike flush.

3.4 Placing and Bonding

- .1 Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- .2 Lay hollow masonry units with face shell bedding on head and bed joints.
- .3 Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- .4 Remove excess mortar as work progresses.
- .5 Interlock intersections and external corners.
- .6 Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- .7 Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- .8 Cut mortar joints flush where wall tile is scheduled, or resilient base is scheduled.

3.5 Provision for Movement

- .1 Leave 6 mm deflection space below shelf angles. Insert foam rod and sealant as specified in Section 07 92 00.
- .2 Leave 25 mm space between top of non-loadbearing wall and structural elements. Do not use wedges.

3.6 Reinforcement and Anchorage

- .1 Install masonry connectors and reinforcement in accordance with CSA A370, CSA A371 and CSA S304.1.

- .2 Place joint reinforcement spaced at 400 mm vertically in accordance with CSA 371 or as indicated on Structural Drawings.
 - .1 Lap joint reinforcement ends minimum 150mm.
- .3 Reinforce and grout masonry units and bond beams in accordance with CSA A371 or as indicated on Structural Drawings.
 - .1 Lap vertical reinforcing bar 650 mm for 15M bar and 850 mm for 20M bar.
 - .2 Centre vertical reinforcing bar in the wall unless noted otherwise.
 - .3 Install vertical reinforcing steel with a minimum clearance of 13 mm from the masonry and not less than one bar diameter between bars.
- .4 Secure reinforcing steel in place. Inspect steel connections before grouting.
- .5 Provide cleanout openings at bottom of cores containing reinforcement.
- .6 Fill cells containing reinforcement and anchor bolts solidly with grout.
- .7 Install reinforcement at sides of openings. Refer to Structural Drawings.
- .8 Provide additional vertical reinforcement of two (2) 20m bars where basketball backstop assemblies attach to the masonry block. Provide 2 horizontal bond beams at each end of backstop connection to the wall. Bond beam to extend full distance between columns.

3.7 Lateral Support and Anchorage

- .1 Space supports and anchors in accordance with CSA A370, CSA A371 and CSA S304.1.
- .2 Field welding to be performed by licensed welders having current welders' certificates to CSA W47.1 (steel).

3.8 Support of Loads

- .1 Grout bond beams as indicated on the drawings.
- .2 Install building paper below voids to be filled with grout; keep paper 25 mm back from face of units.

3.9 Engineered Masonry

- .1 Lay masonry units with core cells vertically aligned clear of mortar and unobstructed.
- .2 Reinforce masonry unit cores with reinforcement bars and grout in accordance with CSA A179, CSA A371 and CSA S304.1.

3.10 Control and Expansion Joints

- .1 Provide continuous control joints as indicated.
- .2 Do not continue horizontal joint reinforcement through control and expansion joints.
- .3 Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's written instructions.
- .4 Size control joint in accordance with Section 07 92 00 for sealant performance.

- .5 Form expansion joint as detailed.

3.11 Built-in Work

- .1 As work progresses, install built-in metal door and glazed frames, window frames, access doors supplied by Architectural, Mechanical and Electrical trades, wood nailing strips, anchor bolts, plates, and other items to be built-in the work and furnished by other sections.
- .2 Install built-in items plumb and level.
- .3 Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

3.12 Tolerances

- .1 Tolerances for unit masonry as recommended in CSA A371.

3.13 Cutting and Fitting

- .1 Cut neatly for electrical switches, outlet boxes and other recessed or built-in objects. Coordinate with other sections of work to provide correct size, shape, and location.
- .2 Make cuts straight, clean and free of uneven edges.
- .3 Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.14 Field Quality Control

- .1 Inspect and test all engineered masonry work.

3.15 Cleaning

- .1 Remove excess mortar and mortar smears as work progresses.
- .2 Replace defective mortar. Match adjacent work.
- .3 Clean soiled surfaces with cleaning solution.
- .4 Use non-metallic tools in cleaning operations.
- .5 Remove settled dust from building surfaces and permanently installed equipment.

3.16 Protection of Finished Work

- .1 Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION

PART 1 – GENERAL

1.1 Section Includes

- .1 Wind/suction and Axial load bearing formed steel stud for exterior wall assembly.
- .2 Non-load bearing wall framing and bracing for exterior partitions, canopies, soffits and other assemblies.
- .3 Section does not include light gauge framing for erection of interior drywall partitions. Refer to Section 09 21 16.

1.2 Related Work

- .1 Section 06 10 00 - Rough Carpentry: Wood sheathing and blocking.
- .2 Section 06 16 43 - Gypsum Sheathing.

1.3 References

- .1 CISC - Cold-Formed Steel Design Manual.
- .2 ANSI/AWS D1.3-98 - Structural Welding Code – Sheet Steel.
- .3 ASTM A123/A123M-02 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .4 ASTM A653/A653M-04a - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .5 ASTM C955-06 - Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
- .6 CAN/CSA-S16-01 - Limit States Design of Steel Structures.
- .7 CAN/CSA-S136-01 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- .8 CSA W47.1-03 - Certification of Companies for Fusion Welding of Steel Structures.
- .9 CSA W55.3-1965(2003) - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .10 CSA W59-03 - Welded Steel Construction (Metal Arc Welding).
- .11 CSSBI (Canadian Sheet Steel Building Institute - 51-06 - Lightweight Steel Framing Design Manual, 2nd Edition.

1.4 System Description

- .1 Size components to withstand design loads cited by CSSBI and applicable code for wind/suction loads.
- .2 Maximum Allowable Deflection Under Loads: 1:600 of span.
- .3 Wall Assembly:
 - .1 Design to CSSBI 51, applicable code and CSA S136.
 - .2 Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

- .3 Design to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.5 Submittals

- .1 Submit in accordance with Sections 01 00 00
- .2 Shop Drawings - Load-Bearing Assemblies only:
 - .1 Indicate component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related work.
 - .2 Indicate stud and runner layout.
 - .3 Describe method for securing studs to tracks and for framing connections.
 - .4 Provide calculations for loadings and stresses of specially fabricated framing, under the Professional Structural Engineer's seal.
- .3 Product Data: Provide data on standard framing members and sill gasket; describe materials and finish, product criteria, and limitations.
- .4 Manufacturer's/Installer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.6 Quality Assurance

- .1 Calculate structural properties of framing members in accordance with CSA W47.1, CSA W55.3, CSA W59 requirements.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.
- .3 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by manufacturer.
- .4 Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of New Brunswick.
- .5 Form, fabricate, install, and connect components in accordance with ML/SFA 540 - Lightweight Steel Framing Systems Manual.

1.7 Mock-Ups

- .1 Perform in accordance with Sections 01 00 00.
- .2 Field Mock-up: Fabricate and erect mock-ups as required by Section 01 00 01. Accepted mock-ups will demonstrate minimum standard of quality required for work of this Section. Mock-up may remain as part of the Work.
- .3 Locate where directed by Engineer-Architect.

1.8 Coordination

- .1 Coordinate with other work having a direct bearing on work of this section.
- .2 Coordinate the placement of components within the stud framing assembly.

PART 2 - PRODUCTS

2.1 Framing Materials

- .1 Framing Materials: Cold-rolled steel conforming to CSA S136, with metallic coating to ASTM A653/A653M, minimum coating thickness Z180 (G60).
 - .1 Studs: ASTM C955, formed to channel shape, punched web, knurled faces; depth and spacing as indicated; gauge to be engineered by this Section.
 - .2 Track: Formed steel; channel shaped; same width and gauge as studs, tight fit.
 - .3 Deflection Track: Double top track to accommodate deflection in structure.
 - .4 Recycled Content: minimum 26% recycled content.

2.2 Accessories

- .1 Bracing, Furring, Bridging: Formed sheet steel, thickness determined by performance requirements specified.
 - .1 Recycled Content: minimum 26% pre-consumer and post-consumer recycled content.
- .2 Plates, Gussets, Clips: Formed sheet steel, thickness determined by performance requirements specified.
- .3 Welding Materials: CSA W59.
- .4 Touch-Up Primer for Galvanized Surfaces: SPCC 20 Type I Inorganic, zinc rich (ZRC) cold galvanizing compound, premixed, UL labelled, liquid organic zinc compound, containing minimum 92% metallic zinc by weight in the dried film, solids content between 65% and 69% by weight.
 - .1 VOC Limit < 100 g/l when tested in accordance with USEPA Method 24 and ASTM D2369.
- .5 Compressible Foam Gasket: sill plate gasket; polyethylene foam, minimum thickness 6 mm x full width of sill plate.

2.3 Fasteners

- .1 Bolts, Nuts and Washers: ASTM A307 or ASTM A325, hot-dip galvanized to minimum requirements of CSSBI.
- .2 Self-drilling, Self-tapping Screws, Bolts, Nuts, and Washers: Steel, hot dip galvanized to ASTM A123, 380g/sq m.
- .3 Anchorage Devices: Drilled expansion bolts, screws with sleeves.

2.4 Fabrication

- .1 Fabricate assemblies of formed sections of sizes and profiles required.
- .2 Provide cut-outs centered in webs of members to accommodate services and through-the knockout style bridging.
- .3 Fit, reinforce, and brace framing members to suit design requirements.
- .4 Fit and assemble in largest practical sections for delivery to site, ready for installation.
- .5 Do welding to CSA S136, CSA W59 and AWS D1.3, as applicable.

PART 3 – EXECUTION

3.1 Examination

- .1 Verify that substrate surfaces and building framing components are ready to receive work.
- .2 Verify that rough-in utilities are in proper location.

3.2 Erection

- .1 Lightweight steel framing shall be erected true and plumb within the specified tolerances.
- .2 Temporary bracing shall be employed wherever necessary to withstand all loads to which the structure may be subject during erection and subsequent construction.
- .3 Temporary bracing shall be left in place as long as required for the safety and integrity of the structure.
- .4 The erector shall ensure that during erection a margin of safety consistent with the requirements of the National Building Code and CSA-S136 exists in the uncompleted structure.

3.3 Erection Tolerances

- .1 For axial load bearing studs, out of plumbness and out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
- .2 For wind bearing studs, out of plumbness shall not exceed 1/500th of the member length. Out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
- .3 For joists, out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
- .4 For track, camber shall not exceed 1/1000th of the member length.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Integral balusters and handrailing.
- .2 Loose hand-railings, wall-mounted.

1.2 Related Sections

- .1 Section 05 12 23 – Structural Steel.
- .2 Section 09 91 00 – Painting.

1.3 References

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A500-03a, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - .4 ASTM A924/A924M-07, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian Standards Association (CSA)
 - .1 CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S136-01, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .4 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
 - .5 CSA W55.3-1965 (R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .6 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .3 National Association of Architectural Metal Manufacturers (NAAMM).
 - .1 NAAMM AMP 510-92 - Metal Stairs Manual.
 - .2 NAAMM MBG 531-00 - Metal Bar Grating Manual.
- .4 SSPC (The Society for Protective Coatings) (formerly SSPC - Steel Structures Painting Council) - Steel Structures Painting Manual.

1.4 Performance Requirements

- .1 Design stairs and railings to withstand a vertical live load of 4.8 kn/m² and a horizontal live load at the top of rail of 0.75 kn/m; prime finish metal components for interior, galvanize for exterior.
- .2 Fabricate stair assembly to support a uniform live load of 4.8 kPa and a concentrated load of 1.4 KN with deflection of stringer or landing framing not to exceed 1/360 of span.
- .3 Railing assembly, wall rails, and attachments to resist lateral force of 333 N at any point without damage or permanent set.
- .4 Fabricate stair assembly to NAAMM - Metal Stairs Manual.

1.5 Submittals

- .1 Submit in accordance with Sections 01 00 00 and 01 30 00.
- .2 Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Supplement two-dimensional technical drawings with three-dimensional CAD drawings of all finished intersections.
 - .1 Indicate welded connections using standard welding symbols. Indicate net weld lengths.
 - .2 Submit shop drawings bearing stamp of a qualified professional engineer registered in the Province of New Brunswick.
 - .3 Shop drawings shall be provided that represent all components in their assembled configuration.
- .3 Provide written documentation currently dated from the Canadian Welding Bureau confirming the current qualifications of the steel contractor to perform the work requirements of CSA W47.1. This letter to be signed by an authorized representative of the Canadian Welding Bureau and countersigned by an authorized representative of the steel contractor.
- .4 Product data: Submit for primer and coating products supplied by this Section.

1.6 Quality Assurance

- .1 Perform Work in accordance with requirements of National Building Code.
- .2 Fabricator: Company specializing in welded structural building components with 10 years documented experience and approved under CSA W47 and CSA W55.3.

PART 2 - PRODUCTS

2.1 Materials - Steel

- .1 Steel Sections and Plates: CAN/CSA-G40.20/G40.21, Grade 350W. Minimum post-consumer recycled content of 75%.
- .2 Steel Tubing: ASTM A500, Grade B, black or galvanized finish as scheduled. Minimum 20% post-consumer and 5% pre-consumer recycled content.
- .3 Stainless Steel Pipe: ASTM A53/A53M, round as indicated, standard weight, black or galvanized finish as scheduled. Minimum 20% post-consumer and 5% pre-consumer recycled content.
- .4 Tread and Landing Concrete Reinforcement: Type as detailed, unfinished.
- .5 Bolts, Nuts, and Washers: ASTM A307 galvanized to CSA G164 for galvanized components.
- .6 Welding materials: to CSA W59.
- .7 Shop and Touch-Up Primer: SPCC 15, Type 1, red oxide.
 - .1 VOC Limit < 250 g/l when tested in accordance with USEPA Method 24 and ASTM D2369.
- .8 Touch-Up Primer for Galvanized Surfaces: Zinc rich (ZRC) cold galvanizing compound, premixed, UL labelled, liquid organic zinc compound, containing minimum 92% metallic zinc by weight in the dried film, solids content between 65% and 69% by weight.
 - .1 VOC Limit < 100 g/l when tested in accordance with USEPA Method 24 and ASTM D2369.

2.2 Components

- .1 Steel Decking: Galvanized steel sheet to ASTM A924M Grade A, physical properties in accordance with CSA S136, minimum 1.0 mm sheet thickness, 38 mm deep profile noncellular, ribbed faces for concrete bond, interlocking side laps.
- .2 Concrete for Treads and Landings: Portland cement Type I, 25 MPa 28 day strength, 50 to 75 mm slump.

2.3 Fabrication - General

- .1 Fit and shop assemble components in largest practical sections, for delivery to site.
- .2 Fabricate components with joints tightly fitted and secured.
- .3 Continuously seal joined pieces by continuous welds.
- .4 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Completed joints to have no visual demarcation on the steel. Ease exposed edges to small uniform radius.
- .5 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- .6 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- .7 Accurately form components required for anchorage of stairs and landings and railings to each other and to building structure.

2.4 Fabrication – Pan Stairs and Landings

- .1 Fabricate stairs with closed risers and treads of pan construction, ready to receive concrete.
- .2 Secure tread pans to stringers with clip angles; welded in place.
- .3 Form stringers with rolled steel channels as indicated. Close ends of stringers with welded plates.
- .4 Form landings of steel deck construction. Reinforce underside with structural steel shapes to attain design load requirements.
- .5 Reinforced concrete fill in treads and landings with deformed bars, spot welded and suspended mid slab.
- .6 Form guards and pipe railings as indicated, welded to stringers.
- .7 Prime paint components.

2.5 Finishes

- .1 Prepare surfaces to be primed in accordance with SSPC SP 6.
- .2 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .3 Prime paint items with one coat. Field finish paint to Section 09 91 00.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that field conditions are acceptable and are ready to receive work.

3.2 Preparation

- .1 Clean and strip primed steel items to bare metal where site welding is required.
- .2 Supply items required to be cast into concrete or embedded in masonry with setting templates.
- .3 Ensure all components, particularly hand railings, are smooth and free from slag and other deleterious material, prior to priming.

3.3 Installation

- .1 Install items plumb and level, accurately fitted, free from distortion or defects.
- .2 Provide anchors, plates, angles, hangers and struts required for connecting stairs to structure.
- .3 Anchor railings to walls with anchors; weld to guards and structural members.
- .4 Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- .5 Field weld components indicated on shop drawings. Perform field welding in accordance with CSA W59. Welds shall be continuous.
- .6 Field bolt and weld to match shop bolting and welding. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- .7 Mechanically fasten joints butted tight, flush, and hairline. Grind welds smooth and flush.
- .8 Obtain approval prior to site cutting or creating adjustments not scheduled.
- .9 After erection, prime welds, abrasions, and surfaces not shop primed galvanized, except surfaces to be in contact with concrete.

3.4 Erection Tolerances

- .1 Maximum Variation from Plumb: 6 mm per storey, non-cumulative.
- .2 Maximum Offset from True Alignment: 6 mm.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Roof curbs, cants, and perimeter nailers.
- .2 Blocking in wall and roof openings.
- .3 Wood furring and grounds.
- .4 Equipment mounting boards.
- .5 Framing and miscellaneous wood blocking, curbs and grounds.
- .6 Wall and Roof framing: load bearing and non-load bearing.
- .7 Wall sheathing.
- .8 All associated fasteners and hardware.

1.2 Related Sections

- .1 Building Insulation: Section 07 21 00
- .2 Painting: Section 09 91 00

1.3 References

- .1 CANPLY (Canadian Plywood Association) - Canadian Plywood Handbook.
- .2 CSA B111-1974 (R2003) - Wire Nails, Spikes and Staples.
- .3 CSA O141-05 - Softwood Lumber.
- .4 CSA O151-04 - Canadian Softwood Plywood.
- .5 National Lumber Grades Authority (NLGA) - Standard Grading Rules for Canadian Lumber 2005.
- .6 CSA-086-01 (R2000), Engineering Design in Wood (Limit States Design)
- .7 ASTM A-307-00, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI tensile strength.
- .8 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .9 CSA-O437 Series-93 (R2006), Standards on OSB and Waferboard.
- .10 CSA O325-07, Construction Sheathing.
- .11 CSA B34, Miscellaneous Bolts and Screws.

1.4 Submittals

- .1 Submit to Sections 01 00 00.
- .2 Product Data:
 - .1 Submit for each adhesive, sealant or coating product supplied by this Section. Submit for panel products supplied by this Section.

1.5 Quality Assurance

- .1 Lumber Products: Graded and stamped to NLGA requirements.
- .2 Plywood Products: Certified and graded to CANPLY requirements.
- .3 OSB in accordance with CSA standards.

1.6 Delivery, Storage and Protection

- .1 Protect materials from warping or other distortion by stacking in vertical position.

PART 2 - PRODUCTS

2.1 Lumber Material

- .1 Lumber: NLGA (Standard Grading Rules for Canadian Lumber).
 - .1 CSA O141, softwood SPF species, Grade 2. Dimension sizes indicated.
 - .2 19 percent maximum moisture content.
 - .3 Regional Material: Wood members shall be sourced from timber grown and extracted within 800 km of the Project Site.
- .2 Furring, blocking, nailing strips, grounds. Rough bucks, fascia backing and sleepers.
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimensions sizes: "Standard" light framing of better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.
 - .4 Regional Material: Wood members shall be sourced from timber grown and extracted within 800 km of the Project Site.
- .3 Plywood:
 - .1 CSA O151 (CSP), CANPLY Grade SHG; unsanded, exterior use, thicknesses as indicated; No added Formaldehyde or use Ultra low-emitting formaldehyde resin.
 - .1 General use and equipment mounting boards: Sheathing (SHG).
 - .2 Exterior use: Sheathing (SHG); exterior grade, tongue and groove, thickness as indicated.
 - .3 Pressure preservative treatment: to CSA O80.9, plywood to CSA O151 and graded as specified.

2.2 Accessories

- .1 In accordance with Part 9 of NBCC 2005 as supplemented by following requirements except where specific type is indicated elsewhere herein or on the drawings.
- .2 Embedded Anchor Rods: Galvanized threaded rod to CSA G40.20/G40.21, Grade 300W, complete with same-strength nuts and washers, size as shown on Drawings.

- .3 Fasteners and Anchors:
 - .1 Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - .2 Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt fastener for anchorages to steel.
- .4 Resilient Furring: to ASTM C645.
- .5 Sill Plate Gasket: 6 mm thick, plate width, closed cell polyethylene foam from continuous rolls.
- .6 Fasteners for wood:
 - .1 Nails, spikes and staples: to CSA B111.
 - .2 Bolts: [12.5] mm diameter unless indicated otherwise, complete with nuts and washers.
 - .3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
- .7 Framing Anchors:
 - .1 Framing anchors, truss anchors, and strap ties: galvanized sheet steel. Anchors and strap ties to be of type and thickness as shown on the structural drawings. See details and notes on drawings for details.
 - .2 Install nails in each hole provided in each anchor.

PART 3 - EXECUTION

3.1 Construction

- .1 Comply with requirements of NBC 2010, Part 9, unless these specification or requirements shown on the drawings are more restrictive in which case the more restrictive requirements shall apply.
- .2 Prior to commencing work, field verify all existing conditions and dimensions and fabricate members as required to suit existing. Report discrepancies to the Owner.

3.2 Framing and Curbing

- .1 Set members level and plumb, in correct position.
- .2 Place horizontal members, crown side up.
- .3 Construct curb members of single pieces.
- .4 Space framing and furring as indicated.
- .5 Place foam sill plate gasket under framed assemblies in contact with concrete surfaces.
- .6 Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- .7 Coordinate curb installation with installation of decking and support of deck openings, roofing vapour retardant, and parapet construction.
- .8 Construct continuous members from pieces of longest practical length.
- .9 Make adequate provision for all possible erection stresses.

- .10 Securely brace members in place to maintain plumb and true until permanently fixed and held in structure.
- .11 Provide fasteners and anchors at locations as shown or specified on the drawings.

3.3 Openings

- .1 Frame and block openings for support of door and window frames, and other equipment, as indicated.

3.4 Electrical and Mechanical Equipment Mounting Boards

- .1 Fabricate boards using 19 mm plywood sheathing with 19 mm x 38 furring around perimeter and intermediate members spaced maximum 300 mm o.c. vertically. Size the back board by 300 mm beyond size of electrical panel.
- .2 Provide fire retardant painted finish in accordance with Section 09 91 00.

3.5 Blocking and Furring

- .1 Provide solid blocking in walls where required for support of wall-mounted fixtures and assemblies.
- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .3 Fabricate locker base structure as required by locker manufacturer for field fabricated bases.

3.6 Sheathing

- .1 Secure sheathing to framing members with ends over firm bearing and staggered and as specified on the drawings.
- .2 Install sheathing to locations shown on the drawings.
- .3 Align and plumb faces of furring and blocking to a tolerance of 1:600.

3.7 Connectors

- .1 Install nails or bolts in each hole provided in each framing anchor, tie down, strap, hold down, etc.

3.8 Nailing Strips, Grounds and Rough Bucks

- .1 Install rough bucks, nailers and rough linings to openings as required to provide backing for frames and other work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Exterior gypsum sheathing for walls and soffits.

1.2 Related Work

- .1 Section 05 41 00 - Structural Metal Lightweight Framing: Support framing for exterior applications.
- .2 Section 09 21 16 - Gypsum Board Assemblies.

1.3 References

- .1 ASTM C754-00 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board.
- .2 ASTM C1002-01 - Steel Self-Piercing, Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .3 ASTM C1177 / C1177M-08 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

1.4 Submittals

- .1 Sections 01 00 00.
- .2 Shop Drawings: Indicate special details associated with sealing penetrations, lap and seal to window frame air barrier plane.
- .3 Product Data: Provide product data and MSDS on gypsum sheathing.

1.5 Quality Assurance

- .1 Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 Exterior Sheathing

- .1 Water-Resistant Exterior Glass Mat Gypsum Sheathing: to ASTM C1177M:
 - .1 Thickness and Size: 16 mm minimum, maximum available length in place; ends square cut, edges square.
 - .2 Fire Resistance Rating: Type X as defined in ASTM C1396 and ASTM C1177 when tested in accordance with CAN/ULC S101.
 - .3 Recycled Content: Minimum 50% pre-consumer recycled content.
 - .4 Acceptable Products: CGC Securock, GP DensGlass Gold, Cabot Gypsum Blueglass, or approved equal.

2.2 Framing Materials

- .1 Metal Framing and Accessories: Specified in Section 05 41 00.

2.3 Accessories

- .1 Fasteners: ASTM C1002, Type S12 screws, wafer-head design, with strip-out-prevention ribs and self-drilling points; screw heads minimum 10 mm diameter; coated for corrosion resistance.

PART 3 - EXECUTION

3.1 Site Testing and Inspections

- .0 Indoor Air Quality Control Requirements: Perform work in accordance with the project's Indoor Air Quality Control plan for LEED credit Construction Indoor Air Quality Management Plan and as specified in Section 01 81 19.

3.2 Examination

- .1 Verify that site conditions are ready to receive work.

3.3 Sheathing Installation

- .1 Install components in accordance with ASTM C754 and manufacturer's written instructions.
- .2 Coordinate location of openings and through-wall components with other work.
- .3 Coordinate placement of control joints with locations of two-piece telescoping track in stud framing.
- .4 Erect gypsum sheathing, with edges butted tight and ends occurring over firm bearing.
- .5 Use screws when fastening gypsum board to furring or framing.
- .6 Treat cut edges and holes in sheathing with sealant.
- .7 Place sealable exterior control joints consistent with lines of building spaces to maximum spacing of 10 m or as indicated on drawings. Form joint with back to back casing beads spaced apart to form flexible sealant joint.

3.4 Tolerances

- .1 Maximum Variation of Gypsum Sheathing Surface from True Flatness: 6 mm in 3 m in any direction.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- .1 Rough Carpentry: Section 06 10 00
- .2 Metal Siding: Section 07 46 19

1.2 References

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM C612-04, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - .2 ASTM C665-98, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .3 ASTM C1320-99, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
 - .4 ASTM D2369-04, Standard Test Method for Volatile Content of Coatings.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-97, Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .2 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre for Buildings.
 - .3 CAN/ULC-S710.1-05, Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1.
 - .4 CAN/ULC-S710.2-05, Standard for Thermal Insulation - Bead-Applied One Component Polyurethane Air Sealant Foam, Part 2.
- .3 Scientific Certification Systems (SCS)
 - .1 Specification SCS-RRC-01, Certification Specifications for Recycled and Recovered Content.
- .4 Greenguard Environmental Institute (GEI)
 - .1 Greenguard Certification Standards for Low Emitting Products for the Indoor Environment.
- .5 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

1.3 Submittals

- .1 Submit in accordance with Sections 01 00 00.
- .2 Product Data:
 - .1 Submit product data and manufacturer's installation recommendations for each product specified.
 - .2 Submit for each sealant and adhesive product supplied by this Section.

1.4 Mock-Ups

- .1 Comply with Section 01 00 00 for requirements for mock-up.

1.5 Quality Assurance

- .1 Installer Qualifications: Qualified by manufacturer to install manufacturer's products, and who has completed installations similar in design, scope and scale to those indicated for this Project.

1.6 Delivery, Storage and Handling

- .1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .2 Protect from exposure to harmful environmental conditions at temperature and humidity conditions recommended by manufacturer.

PART 2 - PRODUCTS

1.1 Rigid Insulation

- .1 Type 4 Rigid Extruded Polystyrene Insulation (XPS): to CAN/ULC-S701, Type 4, ship lapped edge for single layer applications, CFC free and HCFC free:
 - .1 Compressive Strength: General use 210 kPa (30 psi) and high density 415 kPa (60 psi) where indicated.
 - .2 Thickness: as indicated on Drawings.
 - .3 Acceptable Product:
 - .1 General Use: Owens Corning Foamular C-300, DOW Styrofoam SM or approved equal.

2.2 Batt Insulation

- .1 Fibreglass Batt Thermal Insulation: to CAN/ULC-S702, Type 1, SCS certified recycled content, formaldehyde free or Greenguard certified for indoor air quality.
 - .1 Thickness: as indicated on Drawings.
 - .2 Regional Material: Manufactured within 800km radius of project site.
 - .3 Recycled Content: Minimum 35% post-consumer + ½ pre-consumer recycled content.
 - .4 Acceptable Manufacturers: Johns Manville JM Unfaced, Owens Corning EcoTouch PINK, Knauf Ecobatt.
- .2 Rock Wool Thermal Batt Insulation for Fire Rated Assemblies: to ASTM C612, tested to CAN4-S102, thickness required to fill stud depth as indicated.
 - .1 Combustibility to CAN4-S114: Non-combustible.
 - .2 Surface Burning Characteristics to CAN/ULC S102: Flame Spread: 0, Smoke Developed: 0
 - .3 Thickness: as indicated on Drawings.
 - .4 Recycled Content: Minimum 40% pre-consumer recycled content.
 - .5 Acceptable Products: Roxul SAFE, Thermafiber Safing or approved equal.

2.3 Sound Attenuation Batts

- .1 Fibreglass Sound Batts: to CAN/ULC-S702-97, Type 1, SCS certified recycled content, Formaldehyde free or Greenguard certified for indoor air quality.
 - .1 Thickness: as indicated on Drawings.
 - .2 Regional Material: Manufactured within 800km radius of project site.
 - .3 Acceptable Products: Johns Manville Sound-SHIELD, Owens Corning QuietZone, Knauf EcoBatt or approved equal.

2.4 Foam Sealant

- .1 Expanding Foam Insulation and Sealant: CAN/ULC-S710.1, single component, low expanding polyurethane foam. Compatible with specified rigid insulation.
 - .1 VOC Limit: < 50 g/l when tested in accordance with USEPA Method 24 and ASTM D2369.
 - .2 Acceptable Products: DAPtex latex Multi-Purpose, DOW Enerfoam, Hilti CF812 or approved equal.

2.5 Attachment Devices and Related Accessories

- .1 Adhesive: Low VOC polyurethane construction adhesive, resistant to freezing.
 - .1 VOC Limit: < 70 g/l (0.58 lb/gal) when tested in accordance with USEPA Method 24 and ASTM D2369.
- .2 Impaling Pins and Clips: Corrosion-resistant spindle anchor and self-locking washer type consisting of perforated metal plates with spindle welded to center and self-locking washers.
- .3 Adhesive for Cavity Wall Insulation: VOC compliant type recommended by insulation manufacturer for environmental conditions at time of application.

PART 2 - EXECUTION

3.1 Examination

- .1 Examine the areas and conditions where building insulation is to be installed and identify any conditions detrimental to the proper and timely completion of the work.
- .2 Do not proceed with the work until unsatisfactory conditions are corrected.

3.2 Preparation

- .1 Clean substrates of substances harmful to insulation or vapour retarders, including removing projections capable of puncturing vapour retarders or interfering with insulation attachment.
- .2 Clean all surfaces free of dirt, grime, grease, oil or other substances which would be detrimental to proper bond of adhesives.

3.3 Installation - General

- .1 Install insulation after building substrate materials are dry.
- .2 Comply with insulation manufacturer's written instructions and recommendation applicable to products and application indicated.
- .3 Install insulation in largest possible size to cover areas indicated on Drawings, closely butted together at sides, ends, and against walls, and structural members.
- .4 Extend insulation to the full thickness shown over entire area to be insulated. Neatly cut and fit insulation tightly around obstructions, projections such as pipes, conduits, hangers and other elements, and fill voids with insulation. Remove debris in conflict with insulation installation.
- .5 Fit insulation tight around and behind electrical boxes, plumbing and heating pipes and ducts.
- .6 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures.

- .7 Do not install any insulation that becomes damaged during the course of installation or is no longer in a physical condition to function for the use intended and replace with new material.
- .8 Exercise care to avoid damage and soiling of faces on insulation units which will remain exposed to view. Abut joints accurately with adjoining surfaces set flush.
- .9 Attach insulation in a manner to ensure stability and eliminate sagging.
- .10 Apply a single layer of insulation to the required thickness, unless a double layer is required, to make up the total thickness shown.
- .11 Concealed layers of material must not have a vapour retarder facing.
- .12 Offset both vertical and horizontal joints in multiple layer applications.
- .13 Do not enclose insulation until it has been inspected and approved by Engineer-Architect.

3.4 Installation of Subgrade Rigid Insulation at Foundation Perimeter

- .1 Provide Type 4 XPS, 30 psi compressive strength
- .2 Apply construction adhesive to full bed 3 mm thick.
- .3 Install boards on foundation wall and grade beams as indicated. Install horizontally or vertically to minimize joints.
 - .1 Install boards in full sheets wherever possible; minimize cutting and waste.
 - .2 Place boards in a method to maximize contact bedding.
 - .3 Stagger joints.
 - .4 Butt edges and ends tight to adjacent board and to protrusions.
- .4 Extend boards over control and expansion joints, unbonded to foundation 50 mm on one side of joint.
- .5 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
- .6 Foam fill voids with foam sealant.

3.5 Installation of Semi Rigid Insulation in Cavity Walls

- .1 Provide High-Performance Type 1 board.
- .2 Verify that through-wall penetrations in the air barrier membrane have been sealed prior to commencing the work.
- .3 Install insulation boards over air/vapour barrier membrane starting at base of wall, horizontally between wall ties.
- .4 Place boards in a method to maximize contact bedding. Stagger joints. Butt edges and ends tight to adjacent board and no protrusions.
- .5 Cut with sharp instrument to avoid rough edges. Scarf insulation thickness at steel column locations to ensure cavity thickness is maintained. Secure with insulation retainers provided with veneer ties. Coordinate work with Section 04 26 16.
- .6 Apply continuous 6mm beads of adhesive in a grid pattern to prevent potential air movement behind the insulation boards. Apply adhesive fully around protrusions
- .7 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
- .8 Foam fill voids with foam sealant.

3.6 Installation of Batt Insulation

- .1 Verify that through wall penetrations in the air vapour barrier membrane have been sealed prior to commencing the work.
- .2 Place batts in a method to maximize contact bedding. Stagger joints. Butt edges and ends tight to adjacent batts and no protrusions.
- .3 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
- .4 Install insulation with low VOC adhesives or fasteners recommended by manufacturer.
- .5 Cut with sharp instrument to avoid rough edges. Scarf insulation thickness at steel column locations to ensure cavity thickness is maintained. Install with edges butted tightly. Do not leave voids.

3.7 Installation of Expanding Foam Sealant

- .1 Apply expanding foam to fill irregular voids and cracks and to interface with building envelope, and around doors, windows, louvres and other openings in exterior walls.
- .2 Apply foam sealant to locations shown on Drawings and as described herein.
- .3 Apply expanding foam in accordance with CAN/ULC S710.2 and the manufacturer's written instructions.
- .4 Apply foam to underside of roof drains and adjacent roof deck.
- .5 Foam fill shim spaces around perimeter of openings for frames of doors, windows and curtain walls.
- .6 Foam fill annular space around pipes, electrical boxes, conduits, etc. in insulated walls and roofs.
- .7 Finished surface of foam to be free of voids and imbedded foreign objects. Maintain cured skin.
- .8 Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Self-adhering sheet air and vapour barrier (AVB membrane) in exterior wall assemblies.
- .2 Self-adhesive transition membranes and accessories for air and vapour barrier continuity.
- .3 Testing for membrane adhesion.

1.2 Related Work

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 06 16 43 - Gypsum Sheathing: Exterior wall sheathing.
- .3 Section 07 21 00 - Building Insulation.

1.3 References

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM D4263-83(2005), Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - .2 ASTM D4541-02, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - .3 ASTM E96/E96M-05, Standard Test Methods for Water Vapor Transmission of Materials.
 - .4 ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .5 ASTM E783-02, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
 - .6 ASTM E1105-00, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.
 - .7 ASTM E1186-03, Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.

1.4 Performance Requirements

- .1 Install air and vapour barrier components and assemblies to resist air leakage caused by static air pressure across exterior wall assemblies and other interruptions to the integrity of the building enclosure systems as follows:
 - .1 Maximum air leakage rate of 0.02 L/sec·m² when subjected to a pressure differential of 75 Pa as measured in accordance with ASTM E283.
 - .2 Maximum vapour permeance of 2.0 ng/Pa·s·m² when tested according to ASTM E96.
- .2 Air and vapour barrier system to be a continuous barrier to air infiltration, air exfiltration and water vapour transmission.
- .3 Air and vapour barrier system to act as a liquid water drainage plane, flashed to discharge condensation or water penetration.
- .4 Connections to Adjacent Materials: Provide connections to prevent air leakage and vapour migration at the following locations:

- .1 Foundation and walls, including penetrations, ties and anchors.
- .2 Walls, windows, curtain walls, storefronts, louvers or doors.
- .3 Different wall assemblies, and fixed openings within those assemblies.
- .4 Wall and roof connections.
- .5 Floors over unconditioned space.
- .6 Walls, floor and roof across construction, control and expansion joints.
- .7 Walls, floors and roof to utility, pipe and duct penetrations.
- .8 Seismic and expansion joints.
- .9 All other leakage pathways in the building envelope.

- .5 Make all penetrations of the AVB membrane and paths of air infiltration/exfiltration airtight.

1.5 Submittals

- .1 Sections 01 00 00.
- .2 Product Data: Provide data indicating material characteristics, performance criteria, and limitations. Include data sheets for membrane, primers, and sealants.
- .3 Manufacturer's Installation Instructions: Indicate preparation, installation requirements and techniques, and product storage and handling criteria.
- .4 Field Test Results of Mock-Up: Submit test results of air leakage test, water leakage test and adhesion tests of mock-up in accordance with specified standards, including re-testing if initial results are not satisfactory.

1.6 Qualifications

- .1 Applicator: Company specializing in performing the work of this section with minimum 5 years documented experience.
- .2 For each individual installing the product, provide proof of training from the manufacturer in the installation of the air vapor barrier membrane system.

1.7 Mock-Ups

- .1 Section 01 00 00: Provide mock-up of AVB membrane system.
- .2 Work of this Section to be included in the Exterior Wall Assembly mock-up specified in Section 01 00 00.
- .3 Coordinate the Work of this Section with erection of Work by others.
- .4 Mock-Up Tests for AVB Membrane Adhesion:
 - .1 Test mock-up of AVB membrane for adhesion in accordance with ASTM D4541 using a Type 1 pull tester, modified as follows:
 - .1 Disk used to be 100 mm in diameter,
 - .2 AVB membrane to be cut through to separate the material attached to the disk from the surrounding material.
 - .2 Perform test after curing period recommended by the manufacturer.
 - .3 Record mode of failure and area which failed in accordance with ASTM D4541.
 - .4 Record adhesion value at time of failure.
 - .5 Type and method of adhesion testing may be modified at the discretion of the Architect.
 - .6 Costs of initial testing to be paid by Owner. Subsequent testing to be paid by Contractor.

1.8 Pre-Installation Meeting

- .1 Convene one week prior to commencing work of this section.

1.9 Environmental Requirements

- .1 Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.
- .2 Do not apply AVB membrane to damp or wet substrates.
- .3 Do not install AVB membrane in snow, rain, fog or mist.

1.10 Coordination

- .1 Coordinate the work of this section with all sections referencing this section.

1.11 Warranty

- .1 Material Warranty: Provide manufacturer's standard product warranty, for a minimum 3 years from date of Substantial Performance.
- .2 Installation Warranty: Provide installer's 2 year warranty from date of Substantial Performance, including all components of the air and vapour barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of adhesion, loss of cohesion, failure to cure properly.

PART 2 - PRODUCTS

2.1 Air/Vapour Barrier

- .1 AVB Membrane: Self-adhering, SBS-modified membrane, minimum 1.0 mm thickness.
 - .1 Use regular or low-temperature formulation depending on site conditions, within temperature ranges specified by membrane manufacturer.
 - .2 Provide related accessories including primer, seam tape, mastic, fluid and sealant recommended by manufacturer.
 - .3 Select primer based on environmental and substrate conditions at the time of installation.
 - .4 Acceptable Products: Bakor Blueskin SA, Grace Perm-A-Barrier, IKO AquaBarrier AVB, Meadows Air-Shield, Sopraseal Stick 1100T or approved equal.

1.2 Transition Membrane

- .1 Transition Membrane: Self-adhering transition AVB membrane, SBS-modified, minimum 1.0 mm thickness, field-cut to suit.
 - .1 Top face of membrane to be compatible with subsequent coverings. Provide primer and lap sealant where recommended by manufacturer.
 - .2 Provide VOC compliant primer and lap sealant where recommended by manufacturer.
 - .3 Supplied by same manufacturer as AVB membrane manufacturer.

2.3 Metal Roof Underlayment

- .1 AVB Membrane: Self-adhering, SBS-rubber asphalt compound membrane, with polyethylene anti slip coating minimum 1.0 mm thickness.
 - .1 Use regular or low-temperature formulation depending on site conditions, within temperature ranges specified by membrane manufacturer.
 - .2 Provide related accessories including primer, seam tape, mastic, fluid and sealant recommended by manufacturer.
 - .3 Select primer based on environmental and substrate conditions at the time of installation.
 - .4 Acceptable Products: Bakor Blueskin High Temperature Underlayment (PE 200 HT), or approved equal.

1.4 Accessories

- .1 Penetration and Termination Sealant and Mastic: elastomeric, trowel grade or gunnable material supplied by AVB membrane manufacturer.

PART 2 - EXECUTION

3.1 Examination

- .1 Examine substrates, areas, and conditions under which air and vapour barrier assemblies will be applied, with Applicator present, for compliance with requirements.
- .2 Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
- .3 Ensure that surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
- .4 Ensure that concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
- .5 Ensure that masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
- .6 Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263 and take suitable measures until substrate passes moisture test.
- .7 Verify sealants used in sheathing are compatible with AVB membrane. Perform field peel-adhesion test on materials to which sealants are adhered.
- .8 Do not install AVB membrane until items penetrating it are in place.
- .9 Notify Architect in writing of anticipated problems using AVB membrane over substrate prior to proceeding.

3.2 Surface Preparation

- .1 Clean, prepare, and treat substrate according to AVB membrane manufacturer's written instructions.
- .2 Prime masonry and concrete substrates with conditioning primer.
- .3 Prime glass-fiber surfaced gypsum sheathing with an adequate number of coats to achieve required bond, with adequate drying time between coats.

- .4 Prime sheathing, wood, metal, and painted substrates with primer.
- .5 Apply primer at rate recommended by manufacturer prior to membrane installation. Allow primer to dry completely before membrane application. Apply as many coats as necessary for proper adhesion.
- .6 Perform membrane adhesion tests over each substrate to which AVB membrane is to be installed.
- .7 Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air and vapour barrier and at protrusions.

3.3 Installation

- .1 Install AVB membrane to provide continuity throughout the building envelope. Install materials in accordance with manufacturer's written recommendations and the following:
 - .1 When membrane is properly positioned, press into place and roll membrane with roller immediately after placement.
 - .2 Overlap adjacent sheets in accordance with manufacturer's written recommendations. Roll seams with roller.
 - .3 Install membrane in shingle fashion starting at lowest course.
 - .4 Seal around all penetrations with termination mastic, sealant, or membrane tape in accordance with manufacturer's written recommendations.
 - .5 Install transition membrane through built-up assemblies at building intersections and roof-to-wall intersections. Coordinate with applicable sections.
 - .6 Install transition membrane between window and door frames and other openings indicated, and adjacent vapour barrier and seal edges with sealant. Position laps over firm bearing.
 - .7 Connect AVB membrane continuously to roof vapour barrier, concrete belowgrade structures, windows, curtain wall, storefront, louvers, exterior doors and other intersection conditions.
 - .8 Provide transition membrane at changes in substrate plane under AVB membrane to eliminate sharp inside corners and to smooth transition from one plane to another.
 - .9 Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to smooth transition from one plane to another. Continuously support AVB membrane at all transitions.
 - .10 Provide backup for AVB membrane at deflection and control joints to accommodate anticipated movement.
 - .11 Provide transition at expansion and seismic joints assemblies.

3.4 Field Quality Control

- .1 Cooperate with Architect's testing agency. Allow access to work areas and staging.
- .2 Notify Owner's testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.
- .3 Do not cover Work of this Section until testing and inspection is accepted.

3.5 Cleaning and Protection

- .1 Protect air and vapour barrier assemblies from damage during application and remainder of construction period, according to manufacturer's written instructions.
- .2 Do not allow materials to come in contact with chemically incompatible materials.
- .3 Do not expose AVB membrane to sunlight longer than recommended by the manufacturer.
- .4 Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Composite metal panels and soffits, with related flashings and accessory components.
- .2 Supporting structure.

1.2 Related Work

- .1 Section 07 92 00 - Joint Sealants.

1.3 References

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM B209-06, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .2 ASTM B221-06, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .3 ASTM C297, Standard Test Method for Tensile Strength on Flat Sandwich Constructions in Flatwise Plane.
 - .4 ASTM D1781, Standard Test Method for Climbing Drum Peel for Adhesives.

1.4 Submittals for Review

- .1 Submit in accordance with Section 01 00 00.
- .2 Product Data: Provide data on assembled panel structural capabilities.
- .3 Shop Drawings: Indicate dimensions, panel profile and layout, spans, joints, construction details, methods of anchorage, and method and sequence of installation.
- .4 Colour Samples: Panel material manufacturer's colour samples illustrating full range of colours, finishes and patterns available for factory applied finishes.
- .5 Samples: Submit two samples of each panel finish, in size illustrating finish colour, sheen, and texture.
- .6 Manufacturer's Installation Instructions: Indicate special handling criteria, installation sequence, and cleaning procedures.

1.5 Quality Assurance

- .1 Manufacturer: Company specializing in manufacturing the Products specified in this Section with minimum five years' experience.
- .2 Installer: Company specializing in performing the work of this Section with minimum five years documented experience.

1.6 Pre-Installation Meeting

- .1 Convene one month before starting work of this section.
- .2 Review project conditions and details with Architect for acceptance.

1.7 Delivery, Storage and Handling

- .1 Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- .2 Store pre-finished material off ground with weather protection to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- .3 Prevent contact with materials which may cause discolouration or staining.

PART 2 - PRODUCTS

2.1 Wall Panels

- .1 Composite Metal Panel System: Dry joint system, aluminum face sheets thermally bonded to thermoplastic core, 4.0 mm minimum total thickness.
 - .1 ACP-1 Colour to from standard colours.
- .2 Acceptable Manufacturers: Accumet, Alpolic, Alucobond, Reynobond, subject to confirmation in writing addressed to Architect, prior to tender closing, of ability to match colours. Provide colour samples with submission.

2.2 Components

- .1 Supports:
 - .1 Steel framing to ASTM A653M sheet steel; 18 gauge galvanized steel, sizes and profiles indicated.
 - .2 Steel Angles and Clips: Fabricate to profile indicated, field welded where possible.

2.3 Accessories

- .1 Provide panel system manufacturer's standard accessories, including fasteners, clips, anchorage devices and attachments.
- .2 Joint Sealer: Silicone, in accordance with Section 07 92 00. Colour selected to match finish.

2.4 Fabrication

- .1 Shop fabricate panels to sizes and configurations indicated on the drawings, following panel material manufacturer's written instructions and recommendations.
- .2 Fabrication of component profiles on site is not permitted.
- .3 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .4 Fabricate with sharply cut edges, with no displacement of aluminum sheet or protrusion of core.
- .5 Fabricate panels for installation using concealed fasteners.
- .6 Where final dimensions cannot be established by field measurements, provide allowance for field adjustment as recommended by the fabricator.

PART 3 - EXECUTION

3.1 Examination

- .1 Do not begin installation until substrates are complete and have been properly prepared.

3.2 Preparation

- .1 Protect adjacent work areas and finish surfaces from damage during product installation.
- .2 Install air barrier, as detailed, in specific locations on building.
- .3 Install structural supports as indicated.
- .4 Provide metal flashing as indicated and integrate into panel system.
- .5 Install composite panel system on walls and soffits in accordance with manufacturer's written instructions.
- .6 Permanently fasten panel system to structural supports; aligned, level, and plumb, within specified tolerances.
- .7 Locate panel joints over supports.
- .8 Use concealed fasteners.

3.3 Tolerances

- .1 Maximum Offset from True Alignment Between Adjacent Members Butting or In Line: 1.6 mm.
- .2 Maximum Variation from Plane or Location Indicated on Drawings: 3 mm.

3.4 Cleaning

- .1 Remove site cuttings from finish surfaces.
- .2 Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

3.5 Protection

- .1 Protect finish of installed panels from damage during construction.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Preformed metal siding for walls and soffits; including miscellaneous support framing and furring.
- .2 Brake-formed flashings and trim as required for complete system.

1.2 Related Work

- .1 Section 07 21 00 - Building Insulation.
- .2 Section 06 10 00 – Rough Carpentry.
- .3 Section 07 92 00 - Joint Sealants.
- .4 Mechanical and Electrical Divisions.

1.3 References

- .1 ASTM A167 - Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A606 - Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
- .3 ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A755/A755M - Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process For Exterior Exposed Building Products.
- .5 ASTM A792/A792M - Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
- .6 ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

1.4 System Description

- .1 System: Preformed and prefinished metal siding system of specified profile, complete with support framing, channels, and furring; site assembled.

1.5 Design Requirements

- .1 Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall.
- .2 Maximum Allowable Deflection of Panel: 1/90 of span.
- .3 Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
- .4 Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

1.6 Submittals

- .1 Sections 01 00 01: Submission procedures.
- .2 Shop Drawings: Indicate dimensions, layout, joints, construction details, methods of anchorage, horizontal and vertical flashing reveals and other details at intersections with dissimilar building materials, drips, caps, enclosures and terminations.
- .3 Manufacturer's installation guidelines and material data sheets.
- .4 Samples: Submit two samples of siding, 200 x 200 mm in size illustrating finish colour, sheen, and texture.

1.7 Quality Assurance

- .1 Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three (3) years documented experience.
- .2 Installer: Company specializing in performing the work of this section with minimum three (3) years documented experience.

1.8 Mock-Up

- .1 Sections 01 00 01: Requirements for mock-up.
- .2 Work of this Section to be included in the Exterior Wall Assembly mock-up specified in Section 01 00 00.
- .3 Coordinate the Work of this Section with erection of Work by others.

1.9 Delivery, Storage and Protection

- .1 Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- .2 Store prefinished material off ground protected from weather, to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- .3 Prevent contact with materials which may cause discolouration or staining.

1.10 Coordination

- .1 Coordinate the Work for installation of thermal insulation by Section 07 21 00.
- .2 Coordinate the Work with installation of doors, windows, louvres, and components or materials.

PART 2 - PRODUCTS

2.1 Sheet Materials

- .1 Prepainted Galvanized Steel Sheet: ASTM A653/A653M, Coating Designation G90 (Z275); shop pre-coated. Minimum 20% post-consumer and 5% pre-consumer recycled content.
- .2 Cladding Profile: 0.51 mm (24 gauge) base steel thickness, prepainted galvanized steel sheet;

- .3 MS 1 - Acceptable Profile: Agway 7/8" Corrugated, Roll Form Group Standard Corrugated, Vicwest 2-2/3" x 7/8" Corrugated, Ideal Roofing Corrugated 7/8" or approved equal.
 - .1 Finish and Colour: Vicwest's Weather X equivalent to specified Baycoat colour must be supplied in specified sheet gauge or thicker:
 - .1 MS-1: Colour chosen by Architect from standard colours.
- .4 MS 2 - Acceptable Profile: Vicwest CL6025SR 40% openness or approved equal
 - .1 Perforations : 6mm x 9mm staggered pattern.
 - .2 Colour chosen by Architect from standard colours.

2.2 Components

- .1 Supports: Framing, hat channels, Z-girts; 18 gauge galvanized steel, sizes and profiles indicated.
- .2 Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitred to required angles. Mitred internal corners to be back braced with precoated sheet stock to maintain continuity of profile.
- .3 Expansion Joints: Same material, thickness and finish as exterior sheets type, of profile to suit system.
- .4 Trim, Closure Pieces, Caps, Flashings, Fascias, Infills, Metal Reglet and Counter Flashing: Same material, thickness and finish as exterior sheets; brake formed to required profiles. Trim colours to match adjacent metal siding.

2.3 Insulation

- .1 Refer to Section 07 21 00.

2.4 Accessories

- .1 Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant; colour as selected.
- .2 Closures: Foam and metal closures to suit profiles indicated, to provide complete weathertight barrier.
- .3 Sealants: Silicone type; refer to Section 07 92 00, colours to match adjacent siding panels.
- .4 Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized; fastener cap same colour as exterior panel. Exposed fasteners same finish as panel system.
- .5 Field Touch-up Paint: As recommended by panel manufacturer.

2.5 Fabrication

- .1 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .2 Form pieces in longest practicable lengths.
- .3 Fabricate corners in one continuous piece with minimum 150 mm returns.

PART 3 – EXECUTION

3.1 Examination

- .1 Verify that building framing members are ready to receive panel system.

3.2 Installation

- .1 Install metal siding system on walls in accordance with manufacturer's written instructions.
- .2 Provide all flashings, custom brake-formed shapes, trims and accessories for a complete system.
- .3 Install metal siding horizontally.
- .4 Install metal soffits parallel to short dimension.
- .5 Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- .6 Fasten siding to structural supports; aligned, level, and plumb.
- .7 Locate joints over supports. Lap panel ends minimum 50 mm (2 inches).
- .8 Install cladding with no exposed site-cut or unpainted edges.
- .9 Install siding starting at base of wall and overlap successive lengths in shingle fashion.
- .10 Provide expansion joints where required or recommended by manufacturer.
- .11 Use concealed fasteners unless otherwise approved by Engineer-Architect.
- .12 Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.3 Tolerances

- .1 Maximum Offset from True Alignment Between Adjacent Members Butting or In Line: 1.5 mm.
- .2 Maximum Variation from Plane or Location Indicated on Drawings: 6 mm.

3.4 Cleaning

- .1 Remove site cuttings from finish surfaces.
- .2 Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

PART 1 - GENERAL

1.1 Description

- .1 General Requirements
Division 1, General Requirements, is part of this specification and shall apply as if repeated here.
- .2 Work included:
 - .1 Roof panel and support system.
 - .2 Accessories including associated flashings, closures, sealants.
- .3 Related work not included:
 - .1 Structural framing members including purlins, eave and ridge elements, and other elements required to support the cladding system.
 - .2 Mechanical equipment and/or ductwork as well as their supporting framing.
 - .3 Flashings associated with other trades.

1.2 Standards

- .1 Design of cladding system in accordance to the latest edition of:
 - .1 CSA-S136 for the design of Cold Formed Steel Structural Members.
 - .2 Canadian Sheet Steel Building Institute Standards 10M and 20M.
 - .3 National Building Code of Canada.

1.3 Quality Assurance

- .1 Manufacturer of roof system, and installer shall demonstrate at least five years' experience in projects similar in scope.
- .2 This section establishes the standard of quality required for the complete metal roof system. Proposed substitutions must meet this standard, and will be considered as follows:
 - .1 A written request for approval of a substitution is received at least ten (10) days prior to tender closing.
 - .2 The request includes a complete item-by-item description comparing the proposed substitution to the specified system, together with manufacturer's literature, samples, test data, engineering standards and performance evaluation indicating comparable standards to those specified.

1.4 Design Requirements

- .1 Design roof system to resist:
 - .1 Snow loads and snow build-up and rain load, expected in this geographical region NBCC climatic data, 50 year probability.
 - .2 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.
 - .3 Dead load of roof system.
- .2 Deflection of the roof system is not to exceed 1/240th of the span for the specified live loading.
- .3 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

- .1 Temperature Change (Range): 20 deg C, ambient; 40 deg C, material surfaces.

1.5 Wind Requirements

- .1 The roof panel shall have FM 1-90 windstorm resistance approval.

1.6 Samples

- .1 Submit samples of standard coloured metal roof sheet for review by the consultant, prior to fabrication.

1.7 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01 00 00.
 - .1 Indicate arrangement of pre-finished Roof Sheet, including joints, types and locations of supports, fasteners, flashing, gutters, mitres, and all metal components related to the roof installation.
 - .2 Drawings shall be signed and sealed by a Professional Engineer, attesting to the ability of the metal panels assembly to withstand the specified loads.

1.8 Maintenance Data

- .1 Provide maintenance data for cleaning and maintenance of panel finishes for incorporation into manual specified in Section 01 00 00.

1.9 Product Delivery, Handling and Storage

- .1 Store components and materials in accordance with panel manufacturer's recommendations and protect from elements.
- .2 Protect prefinished steel during fabrication, transportation, site storage and erection, in accordance with CSSBI Standards.

1.10 Guarantee

- .1 For work in this section, warranty by installer against defects or deficiencies in materials or workmanship shall be for a period of one year from date of substantial completion.

1.11 Warranty

- .1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: 20 years after the date of Substantial Completion. The values below are based on normal environments and exclude any aggressive atmospheric conditions.

PART 2 - PRODUCTS

2.1 Materials

.1 ROOF SYSTEM COMPONENTS:

- .1 Roof System: Tradition100-4 on Solid Substrate by Vicwest or approved equal.
- .2 Underlayment: Membrane to meet performance specified in Section 07 27 13.
- .3 Clip System: Thermally responsive clips to be fabricated from a minimum of 0.91 mm (.036") steel, with minimum Z275 galvanized coating designed to accommodate expansion and contraction of the roof sheet.
- .4 Roof Fasteners: As specified by manufacturer, to resist wind uplift and sliding snow forces.
- .5 Prefinished Roof Sheet, exposed to exterior.
- .6 Profile: Tradition 100-4, with I-style ribs at 400 mm spacing.
- .7 Panel: Z275 galvanized (zinc coated) sheet steel conforming to ASTM A653M structural quality Grade 230 having a nominal core thickness 0.76mm (0.030").
- .8 Snap Cap: Provide 25 mm high snap caps for full length of the roof panel and retained by panel clips, fabricated from Z275 galvanized (zinc coated) sheet steel conforming to ASTM A653M structural quality Grade 230 having a minimum nominal core thickness 0.61mm (0.024"). Finish and colour to match roof sheet.
- .9 Snow Dam System:
Engineered system for the mansard roof as indicated on roof plan. Acceptable product: VersaGard 6000 Series by S-5 distributed by Sky Products or approved equal. Painted to match metal roof.

2.2 Panel Finishes

- .1 Prefinished Roof Sheet Coating: Prepainted with WeatherX

2.3 Colour

- .1 Prefinished Roof sheet colour to be selected from the manufacturer's standard colour range.

2.4 Accessories

- .1 Flashing: In accordance with Section 07 62 00. Formed from same materials as the roof sheet. Custom fabricated to suit architectural details, as required.
- .2 Closures: Foam and metal closures to suit profiles selected, to manufacturer's recommendations.
- .3 Sealants: In accordance with manufacturer's recommendation and Section 07 92 00.

2.5 Fabrication

- .1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.
- .2 Fabricate all components of the system in the factory, ready for field installation.
- .3 Provide roof sheet and all accessories in longest practicable length to minimize field lapping of joints.

PART 3 – EXECUTION

3.1 Examination

- .1 Examine work of other Sections upon which work of this Section depends.
- .2 Report all discrepancies to consultant before beginning work on the roof system.

3.2 Installation

- .1 Roof Materials:
 - .1 Underlayment: Install underlayment fully adhered to solid substrate according to manufacturer's recommendations. Ensure all joints are properly lapped and sealed. Tie in with barriers on adjacent surfaces to ensure airtight construction. Provide a continuous seal around all openings in the insulated metal roof system.
 - .2 Clip: Attach Tradition clips using fasteners as recommended by the manufacturer, to suit the substrate.
- .2 Roof Panel Installation
 - .1 Install exterior prefinished roof panels on panel support clips, using manufacturer's proper construction procedure. Ensure metal roofing sheet side-lap is positively retained by clips, and proper sheet coverage is maintained.
 - .2 Install the snap-cap at all side laps as shown on the approved shop drawings. Mitre snap-cap as required to resist water entry.
 - .3 Where indicated on approved shop drawings, secure the end-lap of metal roofing sheets in accordance with the manufacturer's specifications and details to provide a weather-tight seal. Exposed fasteners to match colour of the roof sheet.
 - .4 Provide notched and formed closures, sealed against weather penetration, at changes in pitch, and at ridges and eaves, where required.
 - .5 Install all companion flashing as shown on the shop drawings. Use concealed fasteners when possible. Exposed fasteners to match colour of roof sheet.

3.3 Clean-Up

- .1 Remove protective film from panels.
- .2 Clean exposed panel surfaces in accordance with manufacturer's instructions.
- .3 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Architect and only where appearance after touch-up is acceptable to Architect.
- .4 Replace damaged panels and components that, in opinion of the Architect, cannot be satisfactorily repaired.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Firestopping at all penetrations and perimeter locations of fire resistance rated assemblies, including firestopping of mechanical and electrical service penetrations.

1.2 Summary

- .1 Provide firestop systems consisting of materials, or combination of materials, installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers in accordance with the requirements of the Building Code and authorities applicable to this project.
- .2 Provide firestop systems at locations including, but not limited to, the following:
 - .1 Penetrations through fire-resistance-rated floor and roof assemblies requiring protected openings including both empty openings and openings that contain penetrations.
 - .2 Penetrations through fire-resistance-rated wall assemblies including both empty openings and openings that contain penetrations.
 - .3 Membrane penetrations in fire-resistance-rated wall assemblies where items penetrate one side of the barrier.
 - .4 Joints in fire-resistance-rated assemblies to allow independent movement.
 - .5 Perimeter Fire Barrier System between a rated floor/roof and an exterior wall assembly, including curtain wall.
 - .6 Joints, through penetrations and membrane penetrations in Smoke Barriers and Smoke Partitions.
- .3 Section does not include provision of ULC/UL Listed components which are part of penetrating item assembly, i.e. fire dampers in ductwork, etc.

1.3 Related Work

- .1 Division 04 – Masonry Sections
- .2 Section 05 12 23 – Structural Steel for Buildings
- .3 Section 05 31 00 – Steel Deck
- .4 Section 09 21 16 – Gypsum Board Assemblies

1.4 References

- .1 Underwriters Laboratories Inc. (ULC).
 - .1 Guide BXUVC, Fire Resistance Ratings.
 - .2 Guide XHEZC, Firestop Systems.
 - .3 CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
 - .4 CAN/ULC-S102, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .5 CAN/ULC-S115, Standard Method of Fire Tests of Firestop Systems.
- .2 Underwriters Laboratories Inc. (UL).
 - .1 Guide BXUV7, Fire Resistance Ratings Certified for Canada.
 - .2 Guide XHEZ7, Through-penetration Firestop Systems Certified for Canada.

- .3 UL 2079, Tests for Resistance of Building Joint Systems.
- .3 American Society for Testing and Materials (ASTM).
 - .1 ASTM E2174, Standard Practice for On-site Inspection of Installed Fire Stops.
 - .2 ASTM E2307, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus.
 - .3 ASTM E2393, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
- .4 International Firestop Council (IFC).
 - .1 Guidelines for Evaluating Firestop Systems Engineering Judgments.

1.5 Definitions

- .1 Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, water and hot gases through penetrations and joints between fire rated wall, floor and roof assemblies.
- .2 System Design: An assembly of products designed to maintain the integrity of fire-rated construction when tested in accordance with CAN/ULC-S115, designed by a voting IFC member, certified by an independent ULC licensed testing agency, and ULC/UL Listed.

1.6 Quality Assurance

- .1 Firestop installation must meet requirements of CAN/ULC-S115 tested assemblies.
- .2 For firestop applications for which no ULC or UL System Design is available through a manufacturer, a manufacturer's Engineering Judgment to be submitted to local Authorities Having Jurisdiction for review and approval prior to installation. Engineer Judgment drawings must follow requirements set forth by the International Firestop Council.
- .3 Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience, certified by the firestop manufacturer.

1.7 Quality Control

- .1 Inspection: The Owner may retain an independent inspection agency to examine penetration and joint firestopping in accordance with ASTM E2174 and ASTM E2393.
- .2 Testing will be paid by Owner, except where testing reveals non-compliant installation, for which replacement is to be paid by Installer.

1.8 Submittals

- .1 Submit in accordance with Sections 01 00 00 and 01 30 00.
- .2 Product Data: Provide data on product characteristics, performance and limitation criteria.
- .3 Shop Drawings: Submit System Design listings, indicating ULC or UL design number and including illustrations, applicable to each firestop configuration. Where there is no System Design available for a particular firestop configuration, the Installer to pay for and obtain, from the firestop manufacturer, an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRR) for submittal.

- .4 Schedule: Provide schedule indicating material to be used, building elements to be protected, hourly rating and appropriate references.
- .5 Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- .6 Submit material safety data sheets (MSDS) provided with products delivered to job site.

1.9 Performance Requirements

- .1 Penetrations: Provide and install firestopping systems produced to resist the spread of fire, and the passage of smoke and other gases according to requirements indicated, including but not limited to the following:
 - .1 Firestop all penetrations passing through fire resistance rated wall and floor assemblies and other locations as indicated on the drawings.
 - .2 Provide and install complete penetration firestopping systems that have been tested and approved by third party testing agency.
 - .3 F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, but not less than one hour or the fire resistance rating of the construction being penetrated.
 - .4 T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T ratings, in addition to F ratings, where required by Code.
 - .5 L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, where required by Code.
 - .6 W – Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, where indicated.
- .2 Perimeter Fire Containment Systems: Provide interior perimeter joint systems with fire resistance ratings indicated, but not less than the fire-resistance rating of the floor construction.
- .3 Fire-Resistive Joints: Provide joint systems with fire-resistance ratings indicated, but not less than the fire-resistance rating of the construction in which the joint occurs.
- .4 For firestopping exposed to view, traffic, moisture, and physical damage, provide appropriate firestop systems for these conditions.

1.10 Environmental Requirements

- .1 VOC Limitations: for all materials supplied by this section, the total VOC content must be less than or equal to 250 g/L. less water, when tested to ASTM D2369.
- .2 Comply with manufacturer's recommended requirements for temperature, relative humidity and substrate moisture content during application and curing of materials.
- .3 Do not proceed with installation of firestopping materials when temperatures or weather conditions exceed manufacturer's recommendations.
- .4 Ventilate solvent based and moisture-cure firestopping per manufacturer's instructions by natural means or, where inadequate, by forced air circulation.

1.11 Single Source Responsibility

- .1 Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.

- .2 Where selected firestop system manufacturer cannot provide a System Design to suit site conditions, provide a tested and listed firestop System Design from an alternate manufacturer before using an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA).

1.12 Sequencing and Scheduling

- .1 Do not cover up firestopping installations until receipt of written notice from the Architect.

1.13 Pre-Installation Conference

- .1 Conduct conference at Project site. Review methods and procedures related to firestopping including, but not limited to, the following:
 - .2 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - .3 Review methods and procedures related to firestopping installation.
 - .4 Verify reinforcement, blocking and other ancillary components required by the System Design, installed by others, are in place.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers

- .1 Provide firestopping and smoke seal systems only from manufacturers publishing ULC Listed or UL Certified for Use in Canada System Designs tested in accordance with CAN/ULC-S115.
 - .1 VOC Limit: <250 g/L.
 - .2 Acceptable Manufacturers: A/D Fire, Grace, Hilti, 3M.

2.2 Acceptable Products

- .1 Selection of appropriate system to maintain required fire resistance rating is the responsibility of the Installer.
- .2 Selection to be based on specified performance requirements and is limited to ULC Listed or UL Certified for Use in Canada System Designs tested in accordance with CAN/ULCS115.
- .3 Substitution of products, components or accessories forming part of a System Design is not acceptable, unless accompanied by an EJ or EFRRA from the system manufacturer.

2.3 Accessories

- .1 Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- .2 Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place, as required by System Design.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify openings are ready to receive the work of this section.
- .2 Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping.
- .3 Verify that blocking, anchoring devices, back-up materials, clips, sleeves, supports and other related materials is in place where required by System Design.
- .4 Do not apply firestopping to painted surfaces or surfaces treated with sealers, curing compounds, water repellent or other coatings unless compatibility of materials has been verified.
- .5 Notify the Architect of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.
- .6 Commencement of Work will be considered acceptance of conditions.
- .7 Refer to Fire Separation Plans and Partition Schedule for Fire Resistant Ratings.

3.2 Preparation

- .1 Prime substrates where recommended by firestopping manufacturer using manufacturer's recommended products and methods. Limit priming to area of bond.
- .2 Use masking tape to prevent firestopping from contacting adjoining surfaces scheduled to remain exposed. Remove tape on completion of installation, without disturbing the firestopping seal with substrates.
- .3 Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- .4 Remove incompatible materials which may affect bond.

3.3 Installation - General

- .1 Install firestopping material and components in accordance with System Design and manufacturer's written instructions.
- .2 Install permanent warning labels, provided by firestopping manufacturer, adjacent to openings that may be re-penetrated or disturbed. Include following information:
 - .1 Warning that opening has being firestop protected.
 - .2 System Design number.
 - .3 F rating or FT rating.
 - .4 Fire stop products used.
 - .5 Contact person and phone number in case of modification or new penetration of firestop system.

3.4 Installing Penetration Firestops

- .1 Verify that pipes, conduit, cable, and other items penetrating fire rated construction have been permanently installed prior to firestopping.

- .2 Schedule work so partitions and other construction that conceals penetrations are not erected prior to firestopping.
- .3 Install forming/damming materials and other accessories in accordance with manufacturers written instructions.
- .4 Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
- .5 Install materials to contact and adhere to substrates formed by openings and penetrating items.
- .6 Finish to produce smooth, uniform surfaces for fill materials to remain exposed.

3.5 Installing Firestop Joint Systems

- .1 Install joint fillers to provide support of firestop materials during application.
- .2 Install in full contact with joint substrates.
- .3 Completely fill recesses provided for joint configuration.
- .4 Provide uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability.
- .5 Tool immediately after application and prior to skinning. Form smooth, uniform beads of configuration required to produce fire-resistance rating, eliminate air pockets and ensure contact and adhesion with sides of joint.

3.6 Field Quality Control

- .1 Notify Architect when completed installations are ready for inspection prior to concealing or enclosing area containing firestopping materials.
- .2 Arrange for inspections by Owner's independent inspection agency.
- .3 Where no deficiencies are found, provide repair of inspected installations, paid by Owner, as required to comply with requirements of the System Design.
- .4 Where deficiencies are found, repair or replace the firestopping, at no cost to Owner, to comply with requirements of the System Design.

3.7 Cleaning

- .1 Clean excess materials as work progresses and upon completion of Work.

3.8 Protection of Finished Work

- .1 Protect firestopping during and after curing period from contact with contaminating substances. If damage caused by others, make appropriate repairs at no cost to Owner.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Preparing substrate surfaces.
- .2 Sealant and joint backing.

1.2 Related Work

- .1 Section 04 26 16 - Veneer Masonry
- .2 Section 04 26 19 - Reinforced Unit Masonry.
- .3 Section 06 16 43 - Gypsum Sheathing
- .4 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .5 Section 08 11 13 - Standard Metal Doors and Frames.
- .6 Section 09 21 16 - Gypsum Board Assemblies.
- .7 Section 09 91 00 – Painting.

1.3 References

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM C834-00e1, Standard Specification for Latex Sealants.
 - .2 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.
 - .3 ASTM C920-02, Standard Specification for Elastomeric Joint Sealants.
 - .4 ASTM D2369-04, Standard Test Method for Volatile Content of Coatings.
 - .5 ASTM D5893-96, Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.

1.4 Submittals for Review

- .1 Submit in accordance with Sections 01 00 00 and 01 33 00.
- .2 Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and colour availability.
- .3 Samples: Submit two sample ribbons of sealant, illustrating sealant colours for selection.
- .4 Submit laboratory tests or data validating product compliance with performance criteria specified. Include SWRI validation certificate where required.
- .5 Closeout Submittals: Sealant applicator to submit copies of the Manufacturer's Warranty.

1.5 Submittals for Information

- .1 Submit in accordance with Sections 01 00 00 and 01 30 00.
- .2 Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention, and field quality control testing.

1.6 Quality Assurance

- .1 Installer Qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer. Submit reference list including minimum three projects of similar size and scope.
- .2 Adhesion Pull Tests: the number of adhesion pull tests to be determined by manufacturers weatherseal warranty. Adhesion pull tests to be conducted by or in the presence of manufacturer's representative. Manufacturer to supply Consultant with results of adhesion pull tests. Sealant installer responsible for repairing areas where adhesion pull tests are conducted, without change to the Contract price.
- .3 Manufacturer's Representative: Coordinate with manufacturer's representative to provide access to completed work areas until adhesion pull tests can be completed.

1.7 Delivery, Storage and Handling

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.
- .2 Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight in strict accordance with manufacturer's recommendations.
- .3 Condition products to approximately 16 to 21°C for use in accordance with manufacturer's recommendations.

1.8 Environmental and Safety Requirements

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

1.9 Warranty

- .1 Provide manufacturer's twenty (20) year material warranty for installed silicone sealant.

PART 2 - PRODUCTS

2.1 Sealant Materials

- .1 VOC Limit - Typical for all sealants: < 250 g/l (2.08 lb/gal) when tested in accordance with USEPA Method 24 and ASTM D2369.
- .2 Acoustical sealant: to ASTM C919, single component, non-hardening, non-skinning, synthetic rubber. Acceptable products: Tremco Acoustical Sealant, Pecora BA-98.
- .3 Acrylic latex: to ASTM C 834, single component general purpose siliconized acrylic latex sealant. Acceptable product: BASF Sonnolastic Sonolac, GE L100, Tremco Tremflex 834, Pecora AC-20 + silicone.
- .4 Butyl Sealant: to ASTM C1311, single component, solvent release, non-skinning, nonsagging, black colour; Acceptable Products: Tremco Butyl Sealant, Pecora BA-98..
- .5 Epoxy, flexible: Poured flexible 100% solids epoxy joint filler. Acceptable product: BASF Epolith-P, Sika Loadflex

2, Masterseal CR190, WR Meadows Rezi-Weld Flex.

- .6 Polyurethane Sealant, below grade compatible: Two-component, non-sag to ASTM C920, Type M, Grade NS, Class 25; with $\pm 25\%$ movement capability for vertical joints. Acceptable products: Sika Sikaflex 2C/NS, Pecora Dynatrol II.
- .7 Polyurethane, self-levelling: to ASTM C 920, Type S, Grade P, Class 25, single component self-levelling polyurethane sealant with plus or minus 25 percent movement capability for horizontal joints. Acceptable product: BASF Sonolastic SL1, Tremco Vulkem 45, Sika Sikaflex 1C SL.
- .8 Silicone, one part: to ASTM C 920, Type S, Grade NS, Class 25, single component neutral cure silicone sealant, plus minus 50% joint movement capability. Acceptable product: Dow Corning 795, Tremco Spectrum 2, BASF Omniseal 50, Pecora 895NST.
- .9 Silicone, mildew resistant: to ASTM C 920, single component mildew resistant silicone sealant, +/- 25% movement capability. Acceptable product: Tremco Tremsil 200, Dow Corning 786, BASF Omniplus.

2.2 Accessories

- .1 Primer: Type recommended by the sealant manufacturer and compatible with joint forming materials.
- .2 Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.
- .3 Soft Backer Rod: to ASTM C 1330, non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants. Size required for joint design.
- .4 Closed-Cell Backer Rod: to ASTM C 1330, closed-cell polyethylene rod designed for use with cold-applied joint sealants for on-grade or below-grade applications. Size required for joint design.
- .5 Joint Filler: closed-cell polyethylene joint filler designed for use in cold joints, construction joints, or isolation joints wider than 6 mm. Size required for joint design.
- .6 Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

2.3 Colours

- .1 Unless indicated otherwise in respective technical specification sections, colour selection is at the option of the Consultant.

2.4 Sealant Schedule

- .1 Perimeters of exterior openings where frames meet exterior facade of building. All other exterior applications.
 - .1 Sealant type: Silicone, one part.
- .2 Perimeters of interior door/window frames and surfaces at jambs, heads and where frames meet floor.
 - .1 Sealant type: Acrylic latex. Colour match to frame.
- .3 Perimeter of washroom fixtures, countertop backsplash at wall.
 - .1 Sealant type: Silicone, mildew resistant.
- .4 Building envelope applications (vapour barrier/vapour barrier, vapour barrier/wall opening, etc):

- .1 Sealant type: Acoustical sealant.
- .5 Interior partitions and acoustic applications:
 - .1 Sealant type: Acoustical sealant.
- .6 Interior concrete control joints and sawcuts.
 - .1 Sealant type: Epoxy, flexible.
- .7 Perimeter of interior concrete slab.
 - .1 Sealant type: Polyurethane, self-levelling.
- .8 At junction of dissimilar hard surface materials
 - .1 Sealant type: to suit application
- .9 For locations not included in this schedule, consult with Architect for proper selection of sealants.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that substrate surfaces and joint openings are clean, dry, and free of frost and ready to receive work.
- .2 Verify that joint backing and release tapes are compatible with sealant.

3.2 Preparation

- .1 Remove loose materials and foreign matter which might impair adhesion of sealant.
- .2 Clean and prime joints in accordance with sealant manufacturer's written instructions.
- .3 Perform preparation in accordance with sealant manufacturer's written instructions.
- .4 Protect elements surrounding the work of this section from damage or disfiguration.

3.3 Installation

- .1 Install sealant in accordance with sealant manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Measure joint dimensions and size materials to achieve required 2:1 width/depth ratios.
- .4 Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- .5 Install bond breaker where joint backing is not used.
- .6 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- .7 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- .8 Tool joints concave.

3.4 Field Quality Control

- .1 Joint Sealants: Perform adhesion tests in accordance with manufacturer's written instructions.
- .2 Perform test 21 days after installation at a rate of one test every 300 m of installed sealant.
- .3 Remove sealants failing adhesion test, clean substrates, reinstall sealants and perform retesting.
- .4 Maintain test log and submit report to Consultant indicating tests, locations, dates, results, and remedial actions.

3.5 Cleaning

- .1 Clean adjacent soiled surfaces.

3.6 Protection of Finished Work

- .1 Remove masking tape and excess sealant.
- .2 Protect sealants until cured.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Aluminum tube framing system; glazed as scheduled.
- .2 Perimeter sealant.

1.2 Source Quality Control

- .1 Provide products specified this Section from the same manufacturer.

1.3 Related Work

- .1 Section 07 92 00 - Joint Sealants
- .2 Section 08 80 00 - Glazing.

1.4 Definitions

- .1 Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.5 References

- .1 AA (Aluminum Association) - Designation System for Aluminum Finishes.
- .2 AAMA (American Architectural Manufacturers' Association) - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- .3 AAMA - Aluminum Curtain Wall Design Guide Manual.
- .4 AAMA CW-10 -Curtain Wall Manual #10 - Care and Handling of Architectural Aluminum from Shop to Site.
- .5 AAMA 501 - Methods of Test for Exterior Walls.
- .6 AAMA 611 - Specifications for Anodized Architectural Aluminum.
- .7 ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- .8 ASTM B221/B221M - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .9 ASTM E283 - Test Method For Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.

1.6 Performance Requirements

- .1 General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 1. Glazed aluminum skylights shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads. Failure also includes the following:
 - .1 Thermal stresses transferring to building structure.
 - .2 Glass breakage.
 - .3 Loosening or weakening of fasteners, attachments, and other components.
 - .4 Failure of operating units.
- .2 Delegated Design: Design glazed aluminum skylights, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- .3 Wind loads: Provide Skylight system; include anchorage, capable of withstanding wind load design pressures of 11.5 psf (0.55kPa) inward and 25.5 psf (1.22 kPa) outward. The design pressures are based on the National Building Code, 2015 Edition.
- .4 Snow loads: Provide Sloped Glazing system; include anchorage, capable of withstanding the most critical case for each element from specified snow load design pressures based on the National Building Code; 2015 Edition.
 - .1 Case 1: Full Uniform Snow Load: Uniform Snow Load = 64.3 psf (3.08 kPa)
 - .2 Case 2: Unbalanced Snow Loads: On the upwind side of the roof peak, Snow Load = 12.5 psf (0.6 kPa). On the downwind side of the roof peak, Snow Load = 80.4 psf (3.85 kPa). This case shall be repeated for all directions to determine governing effects of all members.
- .5 Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft² (.0003 m³/s·m²) at a static air pressure differential of 6.24 PSF (300 Pa) or CAN/CSA-A440 fixed rating.
- .6 Water Resistance, (static): The test specimen shall be tested in accordance with ASTM E 547. There shall be no leakage at static air pressure differentials of 15 PSF (718 Pa) minimum or CAN/CSA-A440 B7 rating.
- .7 Uniform Load: A static air design load of 40 PSF (1916 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur or CAN/CSA-A440 C5 rating.
- .8 Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 67frame and 65glass (clear).
- .9 System Design: Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall.
- .10 Seismic Loads: Design and size components to withstand seismic loads and sway displacement.
- .11 Deflection: Limit mullion deflection to flexure limit of glass with full recovery of glazing materials.
- .12 System Assembly: Accommodate without damage to system, components or deterioration of seals, movement within system, movement between system and perimeter framing components, dynamic loading and release of loads, deflection of structural support framing, tolerance of supporting components.

- .13 Air Infiltration: Limit air infiltration through assembly to 0.03 l/s/sq m of wall area, measured at a reference differential pressure across assembly of 300 Pa as measured in accordance with ASTM E283.
- .14 Vapour Seal: Limit vapour seal with interior atmospheric pressure of 25 mm, 22 degrees C, 40 percent RH without seal failure.
- .15 Expansion / Contraction: System to provide for expansion and contraction within system components caused by a cycling temperature range of 95 degrees C over a 12 hour period without causing detrimental affect to system components.
- .16 System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .17 Air and Vapour Seal: Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- .18 Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

1.7 Submittals for Review

- .1 Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow drainage diagrams.
- .2 Design Data: Provide framing member structural and physical characteristics, calculations, climatic data and dimensional limitations. Design data to be stamped by a Professional Structural Engineer licensed at the place where the Project is located.
- .3 Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work. Indicate drainage and condensation paths within assembly.
- .4 Indicate system dimensions, reinforcing, connections to structure, framed opening requirements and tolerances, anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required. Shop drawings to be stamped by a Professional Structural Engineer licensed at the place where the Project is located.
- .5 Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed skylight systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
 - 1. Joinery
 - 2. Glazing

1.8 Quality Assurance

- .1 Installer Qualifications: Installer who has had successful experience with installation of the same or similar systems required for the project and other projects of similar size and scope.
- .2 Manufacturer Qualifications: A manufacturer capable of fabricating exterior sunshades, and glazed aluminum curtain wall and storefront systems, that meet or exceed performance requirements.
- .3 Source Limitations: Obtain glazed aluminum skylights, curtain wall systems and storefront systems through one source from a single manufacturer.

- .4 Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- .5 Perform Work in accordance with AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- .6 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- .7 Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.
- .8 Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the place where the Project is located.

1.9 Pre-Installation Meeting

- .1 Section 01 30 00: Pre-Administrative Requirements.
- .2 Convene one week before starting work of this section.

1.10 Delivery, Storage and Protection

- .1 Section 01 60 00: Transport, handle, store, and protect products.
- .2 Handle work of this Section in accordance with AAMA - Curtain Wall Manual CW-10.
- .3 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Puncture wrappings at ends for ventilation.

1.11 Environmental Requirements

- .1 Do not install sealants when ambient temperature is less than 5 degrees C.
- .2 Maintain this minimum temperature during and after installation of sealants.

1.12 Coordination

- .1 Section 01 30 00: Coordination with other work having a direct bearing on work of this section.
- .2 Coordinate the Work with installation of air barrier placement and vapour retarder placement.

1.13 Warranty

- .1 Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.
- .2 Provide a five (5) year warranty to include coverage for complete system for failure to meet specified requirements.

1.14 Project Conditions

- .1 Field Measurements: Verify actual locations of structural supports for sunshades by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 Manufacturers

- .1 Basis of Design: Anotec Sloped Glazing System - Series 3600, System 64 x 88, externally glazed pressure plate system.
 - .1 Alternate Manufacturers: Kawneer 2000 Skylight System 64 x 76, or approved equal. Alternate manufacturers to provide systems compatible in design and performance to the satisfaction of the Architect prior to tender.

2.2 Materials

- .1 Aluminum Extrusions: Alloy and temper recommended by glazed aluminum skylight manufacturer for strength, corrosion resistance, and application of required finish and each framing member shall provide structural strength to meet specified performance requirements and complying with ASTM B 221: 6063-T6 alloy and temper.
- .2 Aluminum sheet alloy: Shall meet the requirements of ASTM B209.
- .3 Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.
- .4 Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- .5 Pressure Plate: Pressure plate shall be aluminum and fastened to the mullion with stainless steel screws.
- .6 Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- .7 Thermal Barrier: Thermal separator shall be extruded of a silicone compatible PVC (Poly Vinyl Chloride).
- .8 Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of glazed skylight members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Sloped Glazing Framing

- .1 Framing Members: Manufacturer's standard extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Glazing System: 4 sided captured.
 2. Glazing Plane: Front.
- .2 Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
- .3 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
- .4 Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

2.4 Miscellaneous Components

- .1 Insulated Metal Panels: Assembly consisting of 3 mm extruded aluminum panel, semirigid mineral wool insulation, and back pan. Reinforce aluminum panel with internal stiffeners welded to assembly. Refer to Drawings for locations.
 1. Semi-rigid insulation: Mineral wool to ASTM C612, R-value 10.
 2. Back pans: Depth as indicated; Both Aluminum pans with anodized finish to match framing and galvanized metal, as scheduled on drawings. Reinforce back pans with stiffeners welded to pan assembly.

2.5 Sealant Materials

- .1 Sealant and Backing Materials: as specified in Section 07 92 00; of types described below.
 1. Perimeter Sealant: Silicone; colour to match aluminum framing.
 2. Structural Silicone: SSG Silicone as recommended by curtain wall manufacturer; colour to match aluminum framing.

2.6 Glass and Glazing Materials

- .1 Glass Materials: Insulating glass units for exterior locations, tempered single pane glazing for interior locations; refer to Section 08 80 00.
- .2 Glazing Materials: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- .3 Glazing Gaskets: Gaskets to meet the requirements of ASTM C864.
- .4 Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- .5 Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- .5 Glazing Sealants: As recommended by manufacturer for joint type.

2.7 Fabrication

- .1 Form or extrude aluminum shapes before finishing.
- .2 Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints.
 3. Physical and thermal isolation of glazing from framing members.
 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 5. Provisions for field replacement of glazing from exterior.
 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
 7. Internal weeping system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum skylight to exterior.
- .3 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal. Utilize deflection track framing where indicated or otherwise required by design.
- .4 Provide dead load anchors and clips to attach curtain wall assembly to floor slab and supporting structural steel; including suspended assemblies not bearing on foundations or footing.
- .5 Provide reinforcing steel within tubular extrusions where required by design.
- .6 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .7 Prepare components to receive anchor devices. Fabricate anchors.
- .8 Arrange fasteners and attachments to ensure concealment from view.
- .9 Reinforce interior horizontal head rail to receive drapery track brackets and attachments.
- .10 Reinforce framing members for external imposed loads.

2.8 Finishes

- .1 Finish Coatings: Conform to AAMA 611.
- .2 Exposed Aluminum Surfaces:
 - .1 Finish and Colour selected by Architect from the following;
 - .1 AA-M10C21A44, Class I Clear Anodized Coating both externally and internally.
- .3 Shop and Touch-Up Primer for Steel Components: SPCC Paint 25 red oxide.
- .4 Concealed Steel Items: Primed with iron oxide paint.
- .5 Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.
- .3 Verification of existing conditions before starting work.
- .4 Verify dimensions, tolerances, and method of attachment with other work.
- .5 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this Section.

3.2 Installation

- .1 General: Install skylight systems plumb, level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.
 - .1 Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
 - .2 Glazing: Glass shall be outside glazed and held in place with extruded aluminum pressure plates anchored to the mullion using stainless steel fasteners spaced no greater than 9" (228.6) on center.
 - .3 Water Drainage: Each light of glass shall be compartmentalized using joint plugs and silicone sealant to divert water to the horizontal weep locations. Weep holes shall be located in the horizontal pressure plates and covers to divert water to the exterior of the building.
- .2 Install curtain wall system in accordance with manufacturer's written instructions.
- .3 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .4 Provide alignment attachments and shims to permanently fasten system to building structure.
- .5 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .6 Provide thermal isolation where components penetrate or disrupt building insulation.
- .7 Install sill flashings.
- .8 Coordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .9 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .10 Install glass in accordance with Section 08 80 00, to glazing method required to achieve performance criteria.
- .11 Install perimeter sealant to method required to achieve performance criteria.
- .12 Do not install curtain wall components when other trades are conducting operations that may be detrimental to curtain wall components. Steel filings from pipe threading operations is one example, as these may blown onto surface of components.

3.3 Erection Tolerances

- .1 Maximum Variation from Plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.
- .2 Maximum Misalignment of Two Adjoining Members Abutting in Plane: 0.8 mm.
- .3 Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 19 mm and minimum of 6 mm.

3.4 Cleaning

- .1 Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum curtain wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.
- .2 Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.
- .3 Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- .4 Remove protective material from pre-finished aluminum surfaces.
- .5 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .6 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.5 Field Quality Control

- .1 Field Tests: Architect shall select skylight units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 - .1 Testing: Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.
 - .1 Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever ever is greater.
 - .2 Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 8 psf (383 Pa).
- .2 Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Glass and glazing for sections referencing this section for products and installation.

1.2 Related Work

- .1 Section 08 63 16 – Glazed Aluminum Skylights

1.3 Reference Standards

- .1 IGMAC (Insulated Glass Manufacturers Association of Canada) - Quality Standard Specification.
- .2 GANA - Glazing Manual and Glazing Sealing Systems Manual.
- .3 CAN/CGSB 12.1-M90 - Tempered or Laminated Safety Glass.
- .4 CAN/CGSB 12.8-97 - Insulating Glass Units.
- .5 CAN/CGSB 12.11-M90 - Wired Safety Glass.

1.4 System Description

- .1 Glass and glazing materials of this section shall provide continuity of building enclosure air barrier and vapour retarder.
- .2 Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass.
- .3 Limit glass deflection to flexure limit of glass with full recovery of glazing materials, whichever is less.

1.5 Submittals

- .1 Submit in accordance with Section 01 33 00.
- .2 Glazing Schedule: Submit glazing schedule indicating installed locations of materials supplied by this Section for review by Architect at least 4 weeks prior to ordering materials of this Section but not before approval of submitted samples.
- .3 Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.
- .4 Samples: Submit two samples of each specified glazing type 300 x 300 mm in size, illustrating unit coloration and design. Mark each sample with glass type designation as specified by this Section.

1.6 Quality Assurance

- .1 Perform Work in accordance with GANA Glazing Manual and IGMAC for glazing installation methods.
- .2 Select glazing compounds and sealants in accordance with glass manufacturer's instructions.

1.7 Warranty

- .1 Provide a five (5) year warranty.
- .2 Warranty: Include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 - PRODUCTS

2.1 Glass Materials

- .1 Glazing Units:

GL1 – Insulating Glass Unit, 25mm total thickness, for skylight.
6mm clear SNX 62/27 (pos #2) tempered
+ 12.5mm Black Rmax warm edge spacer and 90% argon
+ 5mm clear/.030 clear pvb/5mm clear

2.2 Glazing Compounds

- .1 Sealant and Adhesives: manufacturer's VOC compliant product required to attain specified performance criteria. Sealants with VOC limit of 250 g/l.

2.3 Glazing Accessories

- .1 Channels, Framing and Retainers: Aluminum extrusions to capture glazing for partitions and smoke baffles. Profiles and sizes shown. Clear anodized finish unless noted otherwise.
- .2 Setting Blocks: Neoprene, EPDM or Silicone, 80 to 90 Shore A durometer hardness.
- .3 Spacer Shims: Neoprene, Silicone, 50 to 60 - Shore A durometer hardness.
- .4 Glazing Tape: Preformed butyl compound with integral resilient tube spacing device.
- .5 Glazing Splines: Resilient silicone extruded shape.
- .6 Insulating Glass Spacer: RMax

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that openings for glazing are correctly sized, within tolerance and clean.

3.2 Preparation

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.3 Glazing Methods

- .1 Verify that selected sealants and glazing tapes are compatible.
- .2 Perform glazing as required by frame manufacturer to achieve specified performance criteria.
- .3 Completed exterior glazed assemblies to provide full perimeter air and vapour seal to the glazed frames and be pressure equalized.

3.4 Confirmation of Glazing Placement

- .1 Provide permanent id on glazing unit to indicate glazing type.
- .2 Provide certification that different glazing types have been installed in appropriate locations.

3.5 Testing

- .1 Testing and reporting will be carried out by an independent testing agency selected by the Architect.
- .2 Coordinate and assist testing agency, and allow access to the Work.

3.6 Cleaning

- .1 Remove glazing materials from finished surfaces.
- .2 Remove labels after work is completed.
- .3 Clean glass.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Glazed infill balustrade panels for stairs, secured to post balusters and pipe railings by division 5.

1.2 References

- .1 CAN/CGSB 12.1-M90 – Tempered or Laminated Safety Glass.

1.3 Submittals

- .1 Submit in accordance with Section 01 30 00.
- .2 Submit product data for railing components and glazing, including manufacturer's installation instructions.
- .3 Samples:
 - .1 Submit two glazing samples 150 mm x 150 mm in size of each glass type, illustrating unit coloration and edge treatment.
 - .2 Submit sample of post balusters and pipe railing.
- .4 Submit shop drawings: Indicate dimensions, sizes, assembly, anchorage and installation details.

PART 2 - PRODUCTS

2.1 Glazed Railing Components

- .1 Glazing: Laminated glass to CAN/CGSB 12.1, clear; 12 mm thickness, eased and polished edges.
- .2 Post Mounted Glass Mounts:
 - .1 Brackets to attach glass panels to round stainless steel balusters: Acceptable Product; CR Laurence Product Nos. RB50SBS 42672, or approved equivalent.

PART 3 - EXECUTION

3.1 Installation

- .1 Install in accordance with manufacturer's written instructions and reviewed shop drawings.
- .2 Install hand railing in accordance with manufacturer's written instructions. Provide stainless steel hardware for mounting.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Interior panels for walls and ceilings.
- .2 Panel and joint treatment.
- .3 Non-loadbearing metal stud wall framing.
- .4 Metal channel ceiling framing.
- .5 Installation of access panels provided by others.
- .6 This Section does not include exterior sheathing for walls and roofs. Refer to Sections 06 16 43 and 07 52 16.

1.2 Related Work

- .1 Section 06 20 00 - Finish Carpentry
- .2 Section 07 21 00 - Building Insulation: Acoustic and Thermal insulation.
- .3 Section 07 84 00 - Firestopping: Coordination of supplemental blocking for ULC/UL Design.
- .4 Section 07 92 00 - Joint Sealants.
- .5 Section 08 11 13 - Standard Metal Doors and Frames.
- .6 Section 09 51 13 - Acoustical Panel Ceilings.
- .7 Section 09 91 00 - Painting.

1.3 References

- .1 ANSI A118.9-99, Cementitious Backer Units (CBU).
- .2 ASTM C475/C475M-02 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C645-04 - Specifications for Non-Structural Steel Framing Members.
- .4 ASTM C754-00 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board.
- .5 ASTM C840-04a - Standard Specification for Application and Finishing of Gypsum Board.
- .6 ASTM C1002-01 - Steel Self-Piercing, Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .7 ASTM C1278/C1278M-03e1 - Standard Specification for Fiber-Reinforced Gypsum Panel.
- .8 ASTM C1280-04 - Standard Specification for Application of Gypsum Sheathing.

- .9 ASTM C1396/C1396M-04 - Standard Specification for Gypsum Board.
- .10 ASTM D3273-00(2005) - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- .11 ASTM E90-04 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- .12 ASTM E119-00a - Method for Fire Tests of Building Construction and Materials.
- .13 GA-201 (Gypsum Association) - Gypsum Board for Walls and Ceilings.
- .14 GA-214 (Gypsum Association) - Recommended Specification: Levels of Gypsum Board Finish.
- .15 GA-216 (Gypsum Association) - Application and Finishing of Gypsum Board.
- .16 GA-801 (Gypsum Association) - Handling Gypsum Board.
- .17 Scientific Certification Systems (SCS).
 - .1 Specification SCS-RRC-01, Certification Specifications for Recycled and Recovered Content.

1.4 Definitions

- .1 GA Level 4 Finish: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges.
- .2 GA Level 5 Finish: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

1.5 Submittals for Review

- .1 Submit in accordance with Sections 01 00 00 and 01 30 00
- .2 Product Data: Provide data on all materials listed in Part 2 of this section.
- .3 Samples: Submit samples for exterior fasteners for all applications.

1.6 Quality Assurance

- .1 Perform Work in accordance with ASTM C840.
- .2 Perform Work in shaftwalls in accordance with ASTM C1280.
- .3 Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.
- .4 Handling Gypsum Board: Comply with GA-801.

1.7 Mock-Up

- .1 Prepare mock-up of work where new gypsum board details interface with existing or new repaired gypsum plaster, for review by Architect and Owner, well in advance of commencement of work of this section, for acceptance.
- .2 Prepare at least two different areas and leave a portion of each area unpainted and the remaining portion is to be painted.
- .3 Accepted repaired and patched areas will become standard of acceptance for the work of this section and can remain as part of the finished product.

PART 2 - PRODUCTS

2.1 Framing Materials

- .1 Recycled Content - Framing Materials: Minimum post-consumer recycled content of 25%.
- .2 Studs and Tracks: ASTM C645; galvanized sheet steel, 25 gauge unless indicated otherwise, C-shape, with knurled faces, and C-H and E-studs and J-runners for shaftwalls.
- .3 Furring, Framing, and Accessories: ASTM C645 and GA-216. Use 200 mm wide 18 gauge studs for blocking for support of finishes and fixtures. Use 25 gauge furring channels for use with abuse resistant gypsum board.
- .4 Fasteners: ASTM C1002. Exterior finish to be corrosion-resistant.
- .5 Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

2.2 Panel Materials

- .1 Standard Gypsum Board: ASTM C1396/C1396M-09a, thickness as indicated, 1200 mm wide x maximum available length in place; ends square cut, tapered edges.
 - .1 Recycled Content: SCS certified, minimum recycled content of 25%.
 - .2 Acceptable Manufacturers: CGC, CertainTeed, Cabot or approved equal.
- .2 Fire Rated Gypsum Board (Type X): ASTM C1396/C1396M, fire resistive type, UL, ULC, or ITS rated; thickness as indicated, 1200 mm wide x maximum available length in place; ends square cut, tapered edges.
 - .1 Recycled Content: SCS certified, minimum recycled content of 25%.
 - .2 Acceptable Manufacturers: CGC, CertainTeed, Cabot or approved equal.
- .3 Moisture Resistant Gypsum Board: ASTM C1396/C1396M, fire resistive and non-rated type, where indicated; thickness as indicated, 1200 mm wide x maximum available length in place; ends square cut, tapered edges.
 - .1 Recycled Content: SCS certified, minimum recycled content of 25%.
 - .2 Acceptable Manufacturers: CGC, CertainTeed, Cabot or approved equal.
- .4 Shaftwall Liner Board: 25 mm thick panels, bevelled edge, 600 mm wide, lengths as required. Identified with UL/ULC label.

2.3 Accessories

- .1 Access Panels: Supplied by others, installed by this Section.
- .2 Sound Attenuation Insulation: to Section 07 21 00.
- .3 Acoustic Sealant: Low VOC, to Section 07 92 00.
 - .1 Use fire rated acoustic sealant to ASTM C919, where fire rated partitions are scheduled.
- .4 Edge Bead at Window and Doors: Where refinishing of existing walls that had the hazardous material removed and new furred out gypsum board applied, use Super L Bead and Archway by Trim Tex; with a 3 1/8" return leg, and pre-scored at 2 5/8", 2 1/8" and 1 5/8". For sizes in-between, use Finish Trim. Archway for finishing arched window returns.
- .5 Corner Beads: GA-216, Metal corner bead.
- .6 Edge Trim: GA-216; Casing bead, L-bead, LK-bead, Z-Shadow trim, LC-bead and Control joints, as noted and required.
- .7 Joint Materials: ASTM C475; paper reinforcing tape, joint compound, adhesive, and water. Mesh tape only where required by ULC Design.
- .8 Panel Fasteners: ASTM C1002, Type S12 screws. Exterior finish to be corrosion resistant.
- .9 Compressible Foam Gasket: sill plate gasket; polyethylene foam, minimum thickness 6 mm x full width of sill plate.
- .10 Corner Guards (**CG**): Surface mounted guards, 16 gauge type 304 stainless steel, 90° corner guard with 90mm standard legs, 1220 long. Mounted with construction adhesive standard; stainless steel screws optional. Available in variable angles and custom sizes. Locations identified on drawings. Acceptable Product: Model CO-8 by Construction Specialties or approved equal.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that site conditions are ready to receive work and opening dimensions are as instructed by the manufacturer.

3.2 Metal Stud Installation

- .1 Install studs in accordance with ASTM C754 and manufacturer's instructions.
- .2 Install sill plate gaskets to all tracks in contact with concrete, top and bottom.
- .3 Metal Stud Spacing: as indicated.
- .4 Refer to Drawings for indication of partitions extending stud framing through the ceiling to the structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.
- .5 Door and Window Opening Framing: Install double studs at frame jambs. Install stud tracks on each side of opening, at frame head height, and between studs and adjacent studs.
- .6 Blocking: Install 38mm thick wood blocking for support of windows, doors, frames, curtain walls, plumbing fixtures, toilet partitions, wall cabinets, wood frame opening, toilet accessories, hardware, kitchen equipment, wall-mounted door stops, firestopping Smart Boards, Tack Boards, White Boards, firestopping and as required.

3.3 Wall and Ceiling Furring Installation

- .1 Erect furring for direct attachment to concrete masonry and concrete walls.
- .2 Erect furring channels; space maximum 400 mm on centre, not more than 100 mm from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 600 mm on centre.

3.4 Furring for Fire Ratings

- .1 Install furring as required for fire resistance ratings indicated.

3.5 Ceiling and Bulkhead Framing Installation

- .1 Install in accordance with ASTM C754 and manufacturer's instructions.
- .2 Coordinate location of hangers with other work.
- .3 Install ceiling framing independent of walls, columns, and above ceiling work.
- .4 Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 600 mm past each end of openings.
- .5 Laterally brace entire suspension system.

3.6 Accessories Installation

- .1 Install access panels to locations required for access.
- .2 Install resilient channels at maximum 600 mm on centre. Locate joints over framing members.
- .3 Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- .4 Install acoustic sealant at gypsum board perimeter at:
 - .1 Metal Framing: Two beads.
 - .2 Base Layer.
 - .3 Face Layer.
 - .4 Caulk all penetrations of partitions by conduit, pipe, duct work, rough-in boxes.
- .5 Install outside corner guards in locations indicated on drawings 100mm AFF and/or to avoid conflict with flooring base material.
- .6 Apply cementitious coating in strict accordance with manufacturers written instructions.

3.7 Panel Installation

- .1 Install panels in accordance with manufacturer's written instructions.
- .2 Moisture Resistant Gypsum Board is to be used in Common, Private and Semi-Private Washrooms containing showers, on all walls and ceilings, except as substrate on ceramic tiled shower stalls. MRGB is to be used on other ceramic tiled walls in the washroom.
- .3 Install shaftwall liner panels in accordance with manufacturer's written instructions and to suit fire rating indicated.

- .4 Erect single layer board in most economical direction, with ends and edges occurring over firm bearing.
- .5 Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- .6 Use screws when fastening to metal furring or framing. Use wafer-head screws for attachment of backer board.
- .7 Double Layer Applications: Secure second layer to first with fasteners. Offset joints of second layer from joints of first layer.
- .8 Treat cut edges and holes in mineral fibre cement panels with exterior latex masonry sealer.
- .9 Place control joints consistent with lines of building spaces and provide wall and ceiling control joints in locations to meet minimum requirements of ASTM C840 and GA216 and as follows:
 - .1 at walls in straight plane over 9 m long.
 - .2 ceilings at 9 m on centre each way, and
 - .3 ceilings where framing direction changes.
- .10 Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

3.8 Joint Treatment

- .1 Finish in accordance with GA-214 Level 4.
- .2 Feather coats on to adjoining surfaces so that camber is maximum 0.8 mm.
- .3 Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.

3.9 Tolerances

- .1 Maximum Variation of Finished Gypsum Board Surface from True Flatness: 3 mm in 3 m in any direction.

3.10 Cleaning

- .1 Remove settled dust from building surfaces and permanently installed equipment.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Tile floor finish using the thinset application method.
- .2 Tile Accessories.

1.2 Related Work

- .1 Section 09 21 16 - Gypsum Board Assemblies.

1.3 References

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1-08, Specification for the Installation of Ceramic Tile (Includes ANSI A108.IA-C, 108.4-.13, A118.1-.10, ANSI A136.1).
- .2 American Society for Testing and Materials (ASTM International) International
 - .1 ASTM C144-04, Specification for Aggregate for Masonry Mortar.
 - .2 ASTM F2170-09, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-95, Surface Sealer for Floors.
 - .2 Tile, Ceramic, ISO 10545
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004, A3005).
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Specification Guide 09 30 00 Tile Installation Manual 2012-2014.
- .6 Tile Council of North America - 2005 Handbook.

1.4 Submittals

- .1 Section 01 00 01: Submission procedures.
- .2 Shop Drawings: Indicate tile layout, patterns, colour arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, and setting details.
- .3 Product Data: Provide instructions for using adhesives and grouts.

1.5 Product Data

- .1 Submit product data in accordance with Section 01 30 00 - Submittal Procedures.
- .2 Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Chemical resistant mortar and grout (Epoxy).
 - .3 Cementitious backer unit.
 - .4 Dry-set Portland cement mortar and grout.

- .5 Elastomeric membrane and bond coat.
- .6 Reinforcing tape.
- .7 Levelling compound.
- .8 Latex-Portland cement mortar and grout.
- .9 Commercial Portland cement grout.
- .10 Organic adhesive.
- .11 Slip resistant tile.
- .12 Waterproofing isolation membrane.
- .13 Fasteners.
- .14 Care, Cleaning and Maintenance

1.6 Samples

- .1 Submit samples in accordance with Section 01 30 00 - Submittal Procedures.
- .2 Floor tile: submit duplicate 300 x 600 mm sample panels of each colour, texture, size, and pattern of tile.
- .3 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external comers of vertical surfaces, each type, colour, and size.

1.7 Delivery, Storage and Handling

- .1 Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- .2 Store material so as to prevent damage or contamination.
- .3 Store materials in a dry area, protected from freezing, staining and damage.
- .4 Store cementitious materials on a dry surface.

1.8 Environmental Conditions

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12°C for 48 h before, during, and 48 h after, installation.
- .2 Do not install tiles at temperatures less than 12°C or above 38°C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15°C or above 25°C.

1.9 Extra Materials

- .1 Provide maintenance materials in accordance with Section 01 75 00 - Closeout Requirements.
- .2 Provide minimum 2% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material to be of same production run as installed material.

1.10 Compatibility

- .1 Provide written declaration that components of Tiling system are compatible include in maintenance manuals in accordance with Section 01 75 00 - Contract Closeout.

PART 2 - PRODUCTS

2.1 Floor Tile

- .1 "PFT" Porcelain Tile: Floor tile to CAN/CGSB-75.1-M, Type 4, Class MRI; 600 mm x 1200 mm x 10.0 mm size, porcelain body, matt finish, R10, Class B slip resistance.
 - .1 Colour: Selected by Engineer-Architect from unrestricted range to a maximum of three (3).
 - .2 Acceptable Products: Serie Chamonix Collection by Delconca USA, no substitutes or equals must match new tile at City Hall.

2.2 Bond Coat Materials

- .1 Mortar: ANSI A118.4, premixed polymer modified Portland cement mortar;
 - .1 Acceptable Products: Flextile 52, Laticrete 254, Mapei Kerabond, TEC SturdiFlex, Kiesel Trio Flex Thin Set and Medium Set Mortar for use on walls.
 - .2 Total VOC content of modified mortar less than or equal to 65 g/L, less water, when tested to ASTM D2369.

2.3 Grout Materials

- .1 Epoxy Grout: To ANSI A118.3, VOC compliant, multi-component sanded and unsanded grout. Epoxy grout to be used in Shower Cubicle, including drying area. Acceptable Products: Laticrete SpectraLOCK PRO Grout, Keisel, Mapei Kerapoxy. Colour selection by Architect.
- .2 High Strength Grout: Efflorescence-free, stain resistant premium cement-based grout. Low VOC. HS Grout to be used in all not wet areas. Acceptable Products: Kiesel Servoperl Royal, Mapei Ultracolor Plus FA, Laticrete Permacolour Select grout, or approved equal. Colour selection by Architect.

2.4 Accessories

- .1 Edge protection for exposed vertical edges:
 - .1 Brushed Stainless Steel 304 edge profile for outside corners and terminations.
 - .2 Visible width approximately 25mm, depth to suit application.
 - .3 Standard of acceptance: Schluter Rondec for corners and Schiene for terminations at adjacent substrates and materials, as required to suit uncoupling membrane and tile thickness. Confirm prior to submitting shop drawings.
- .2 Sealant:
 - .1 Refer to Section 07 92 00 – Joint Sealants for general use products.

PART 3 - EXECUTION

3.1 Installation - General

- .1 Do tile work in accordance with TTMAC Tile Installation Manual, latest edition, except where specified otherwise.
- .2 Apply primers, mortar, waterproofing membrane, tile and grout to clean and sound surfaces.
- .3 Install all products specified in this section as per the manufacturer's recommendations for the specific application, unless otherwise noted.

- .4 Fit tile around obstructions, corners, fixtures, drains, and any other built-in or fixed objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .5 Maximum surface tolerance 1:800.
- .6 Make joints between tile uniform, plumb, straight, true, even and flush with adjacent tile. Align patterns. Joint width as specified above.
- .7 Lay out tiles so perimeter tiles are a minimum of half a tile in width.
- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Install all accessories specified above where required in tile systems
 - .1 Install exposed-edge protection for all tile.
 - .2 Install silicone sealant around all penetrations.
 - .3 Install silicone sealant at all inside corner joins to allow for movement between adjacent, intersection wall surfaces.
- .10 Provide expansion joints, control joints and pressure relieving joints of widths and locations as specified by TTMAC and as approved by Consultant. Do not saw cut joints after installation.
- .11 Allow minimum 24 h after installation of tiles, before grouting.

3.2 Protection of Finished Work

- .1 Prohibit work on new installations for 48 hours.
- .2 Once completed, protect walls from damage due to construction traffic until substantial Performance deficiency reviews, or where directed by Owner's representative.

3.3 Cleaning

- .1 Upon completion and final cure of grouting, thoroughly clean all tile surfaces as per manufacturer's instructions before requesting a final deficiency review by Owner's representative.
- .2 Tile surfaces to be free from grout haze and mortar or grout residue.

3.4 Protection of Finished Work

- .1 Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 Suspended metal grid ceiling system and perimeter trim.
- .2 Acoustic ceiling panels.

1.2 References

- .1 ASTM C635 - Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- .2 ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- .3 ASTM E1264 - Classification of Acoustical Ceiling Products.
- .4 CISCA (Ceilings and Interior Systems Contractors Association) - Acoustical Ceilings: Use and Practice.

1.3 Submittals for Review

- .1 Submit in accordance with Sections 01 00 00 and 01 30 00.
- .2 Product Data: Provide data on metal grid system components, and acoustic units.
- .3 Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.4 Quality Assurance

- .1 Conform to CISCA requirements.

1.5 Environmental Requirements

- .1 Maintain uniform temperature of minimum 16 degrees C and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.6 Project Conditions

- .1 Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- .2 Install acoustic units after interior wet work is dry.
- .3 Coordinate grid layout with Mechanical and Electrical trades prior to commencing work of this Section.

1.7 Extra Materials

- .1 Provide twelve (12) extra panels of each specified type; store where directed.

PART 2 - PRODUCTS

2.1 Panels

- .1 Recycled Content: Mineral fibre with minimum 35% recycled content.
- .2 ACT - Acoustical Tiles: to ASTM E1264, for suspended ceiling system, 610 mm x 610 mm x 16mm size, square edge, cut to suit reflected ceiling plan layout:
 - .1 Acceptable Products: Armstrong RandomTextured; or approved equal.

2.2 System Components

- .1 Suspension system for ACP-1: Non-fire rated, intermediate duty system to ASTM C 635, commercial quality hot dipped galvanized rolled steel, standard white colour;
 - .1 Recycled Content: Minimum 30% recycled content.
 - .2 Acceptable Products: Armstrong Prelude XL, CGC Donn DX, CMC Seismic 1200.
- .2 Accessories: Stabilizer bars, clips, splices, perimeter mouldings, hold down clips, required for suspended grid system.
- .3 Support Channels, Furring and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that layout of hangers will not interfere with other work.
- .2 Report in writing any interference of grid layout with Mechanical and Electrical systems and assemblies.

3.2 Installation - Lay-in Grid Suspension System

- .1 Install suspension system in accordance with ASTM C636 and manufacturer's written instructions and as supplemented in this section.
- .2 Install system capable of supporting imposed loads to a deflection of 1/360 maximum.
- .3 Locate system according to reflected plan. Coordinate layout with Mechanical and Electrical trades prior to commencing work of this Section.
- .4 Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- .5 Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- .6 Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- .7 Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 150 mm of each corner; or support components independently.

- .8 Do not eccentrically load system, or produce rotation of runners.
- .9 Perimeter Moulding:
 - .1 Install edge moulding at intersection of ceiling and vertical surfaces into bed of acoustic sealant with continuous gasket.
 - .2 Use longest practical lengths.
 - .3 Overlap and rivet corners.
 - .4 Provide at junctions with other interruptions.
- .10 Form expansion joints to accommodate plus or minus 25 mm movement. Maintain visual closure.

3.3 Installation - Acoustic Units

- .1 Install acoustic units in accordance with manufacturer's instructions.
- .2 Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- .3 Install units after above ceiling work is complete.
- .4 Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
- .5 Cutting Acoustic Units:
 - .1 Cut to fit irregular grid and perimeter edge trim.
 - .2 Cut square reveal edges to field cut units.
- .6 Install hold-down clips to retain panels tight to grid system within 6 m of an exterior door.

3.4 Erection Tolerances

- .1 Maximum Variation from Flat and Level Surface: 3 mm in 3 m.
- .2 Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

PART 1 - GENERAL

1.1 Related Work

- .1 Section 04 20 00 - Masonry Units.
- .2 Section 09 21 16 - Gypsum Board Assemblies.

1.2 References

- .1 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2004.
- .2 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM D2369-04, Standard Test Method for Volatile Content of Coatings.

1.3 Quality Assurance

- .1 Qualifications: Contractor with minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.

1.4 Submittals

- .1 Submittals in accordance with Section 01 00 00 and 01 30 00.
- .2 Submit product data and instructions for each paint and coating product to be used.
- .3 Samples: Submit full range colour sample chips to indicate where colour availability is restricted.

1.5 Delivery, Storage and Handling

- .1 Packing, Shipping, Handling and Unloading: in accordance with manufacturer's written instructions.
- .2 Remove damaged, opened and rejected materials from site.
- .3 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with temperature range 7°C to 30°C.

1.6 Site Conditions

- .1 Heating, Ventilation and Lighting:
 - .1 Provide heating facilities to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.

- .2 Provide continuous ventilation for seven days after completion of application of paint.
- .3 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.2 Surface and Environmental Conditions:

- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
- .3 Apply paint when previous coat of paint is dry or adequately cured.

PART 2 - PRODUCTS

2.1 Materials

- .1 Paint materials listed in the current MPI Approved Products List (APL) are preferred for use on this project.
 - .1 VOC limits shall govern in the selection of materials.
 - .2 Where the specified MPI System does not contain material meeting the specified VOC limitations, the Contractor shall propose an alternate material for Architect review and approval.
- .2 Provide interior paint products with a VOC range <151 g/L unless noted otherwise.
- .3 Provide exterior paint products with a VOC range <201 g/L unless noted otherwise.
- .4 Conform to latest MPI requirements for interior and exterior painting work including preparation and priming.
- .5 Where more than one MPI System is identified for a substrate, selection of system shall be at finisher's option.

2.2 Colours

- .1 Architect will provide Colour Schedule after Contract award. Allow for accent color on one wall in each room.
- .2 Selection of colours from manufacturer's full range of colours.
- .3 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's instructions.

2.4 Gloss/Sheen Ratings

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level Category	Units @ 60°	Units @ 85°
G1 - matte	0 to 5	max. 10
G2 - velvet	0 to 10	10 to 35
G3 - eggshell	10 to 25	10 to 35
G4 - satin	20 to 35	min. 35
G5 - semi-gloss	35 to 70	
G6 - gloss	70 to 85	
G7 - high gloss	> 85	

- .2 Gloss level ratings of painted surfaces shall be selected by Architect after Contract Award, unless noted otherwise.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 General

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Review Room Finish Schedule and ensure that all new unfinished surfaces are to be finished with a minimum of three coats of appropriate materials. All surfaces, of all rooms identified on Drawings and Room Finish Schedule, are to be finished/painted unless noted otherwise.
- .4 Painting is to be done on existing repaired surfaces and new materials.

3.3 Preparation

- .1 Protection:
- 1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Architect.
 - 2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - 3 Protect factory finished products and equipment.
 - 4 Protect passing pedestrians, building occupants and general public in and about the building.
- .2 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. This means that all existing surfaces identified to be painted, shall be thoroughly prepared prior to painting. Remove foreign matter off of surfaces prior to application of paint. Surfaces not meeting this level of preparation and finishing, will be not accepted.
- .3 Existing steel stair risers, nosings and other exposed steel elements, are to be ground smooth to bare steel, to remove rust and other deleterious material. Prior to commencing painting operations, request review of existing prepared conditions, by Architect at a regular project meeting.

- .4 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

3.4 Application

- .1 Conform to manufacturer's application instructions unless specified otherwise.
- .2 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .4 Sand and dust between coats to remove visible defects.
- .5 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .6 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- .7 All unfinished elements and surfaces shall receive a minimum of 3 coats of the applicable paint/coating.
- .8 Sand existing surfaces with intact, smooth, high gloss coatings to provide adequate adhesion for new finishes.

3.5 Interior Paint and Coating Systems

- .1 Interior painting systems to be based on MPI Premium grade unless noted otherwise.
- .2 Concrete Masonry Units:
 - .1 INT 4.2D - HIPAC Latex Finish:
 - .1 One coat MPI #4 Block Filler having VOC range <51 g/L,
 - .2 Two coats HIPAC Latex.
 - .3 Structural Steel - where not factory painted: overhead and structural members; columns, beams, joists, etc. and adjacent fabrications.
 - .1 INT 5.1C - Waterborne Dry Fall Finish:
 - .1 One coat VOC compliant primer,
 - .2 One coat Waterborne Dry Fall MPI #118.
 - .4 Metal Fabrications - Shop finishing: Ladders, vanity support brackets, etc.
 - .1 INT 5.1E - Alkyd Finish:
 - .1 One coat alkyd metal primer (omit when shop primed),
 - .2 Two finish coats alkyd.
 - .2 INT 5.1B - Water Based Light Industrial Coating:
 - .1 One coat VOC compliant MPI#107 water based rust-inhibitive primer (omit when shop primed),
 - .2 Two finish coats VOC compliant water based emulsion coating.
 - .5 Galvanized Metal: miscellaneous overhead steel pipes, decking, ducts, conduit, etc.
 - .1 INT 5.3H - Waterborne Dry Fall Finish:
 - .1 Two coats Waterborne Dry Fall MPI #133.
 - .6 Galvanized Metal: interior and exterior steel man doors and frames.

- .1 INT 5.3L - Alkyd Finish:
 - .1 One coat VOC compliant non-cementitious primer (omit when shop primed),
 - .2 Two finish coats VOC compliant alkyd.

- .2 INT 5.3K - Water Based Light Industrial Coating (over waterborne primer):
 - .1 One coat VOC compliant MPI#134 water-based primer (omit when shop primed),
 - .2 Two finish coats VOC compliant water-based emulsion coating.

- .7 Dressed Lumber, Finish Carpentry, Millwork, and Wood Paneling:
 - .1 Interior Finish Carpentry and Millwork for Clear Finishes:
 - .1 Shop Finish - INT 6.3K - Polyurethane Varnish Finish: minimum three coats polyurethane finish, or alternatively;
 - .1 Site finish using clear polyurethanefinish; VOC range <276 g/L, minimum three coats.
 - .2 Site Finish - INT 6.3Q/6.4M - Water Based Acrylic Clear Finish: VOC range <276 g/L, minimum three coats.

 - .2 Interior Finish Carpentry and Millwork for Stained Finishes:
 - .1 Shop Finish - INT 6.3E - Polyurethane Varnish Finish (over Stain):
 - .1 One coat semi-transparent stain,
 - .2 Three coats polyurethane.
 - .2 Site Finish - INT 6.3W/6.4U - Water Based Acrylic over Stain:
 - .1 One coat stain VOC range <251 g/L,
 - .2 Three finish coats, VOC range <276 g/L.

 - .3 Interior Finish Carpentry and Millwork for Painted Finishes:
 - .1 Shop Finish - INT 6.3E - Polyurethane Varnish Finish (over Stain):
 - .1 One coat semi-transparent stain,
 - .2 Three coats polyurethane.
 - .2 Site Finish - INT 6.3W/6.4U - Water Based Acrylic over Stain:
 - .1 One coat stain VOC range <251 g/L,
 - .2 Three finish coats, VOC range <276 g/L.

- .8 Plywood Mounting Boards: electrical room.
 - .1 INT 6.4P - Pigmented Fire Retardant finish:
 - .1 Apply to ULC approved procedures.
 - .2 Use MPI#64 Fire Retardant Coating, Latex, Interior, Flat (ULC Approved); VOC range <51 g/L.

- .9 Gypsum Board - Dry Areas: Drywall surfaces, cement board, other wall and ceiling panels including wall-mounted equipment to be painted-out.
 - .1 INT 9.2B - HIPAC Latex:
 - .1 One coat Latex Primer Sealer,
 - .2 Two coats HIPAC Latex.

- .10 Gypsum Board - Wet Areas, Washrooms containing showers, including all walls and ceilings:
 - .1 One coat VOC compliant primer compatible with top coat,
 - .2 Two finish coats Pitt-Glaze WB Water Borne Acrylic Epoxy White & Pastel Comp A (Pastel only).

- .11 Canvas and Cotton Coverings.
 - .1 INT 10.1A - Latex:
 - .1 One coat Latex Primer Sealer,
 - .2 Two coats Latex or alternatively;
 - .3 Paint-out during INT 5.1C - WB Dry fall on structural steel.

- .12 VOC Compliant Epoxy (VCE): Concrete Masonry and Concrete.
 - .1 One coat MPI #4 Block Filler having VOC range <51 g/L (Masonry block only).
 - .2 Two finish coats Water Based Epoxy having VOC range <101 g/l.

3.7 Mechanical and Electrical Equipment

- .1 Provide interior paint products with maximum VOC limits specified by this Section. Where selection of finishes from MPI Approved Products List is limited, selection of alternate materials will be at the option of the Architect.
- .2 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .5 Do not paint over nameplates.
- .6 Keep sprinkler heads free of paint.

3.8 Site Tolerances

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.9 Restoration

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust. Avoid scuffing newly applied paint.

3.10 Schedule

- .1 Room Finish Schedule is provided as a guide. Paint all new unfinished surfaces, both internally and externally, minimum three coats of appropriate material. Paint existing surfaces where new work requires a finish point, i.e. paint new and existing walls into nearest corner to avoid mid-wall variation in colour or texture.
- .2 Paint exposed portions of new metal fabrications and steel stairs.
- .3 Prepare and paint the existing exterior painted ornate wood casings and transoms around and over doors A098.1 and B198.1.
- .4 Prepare and paint the previously painted exterior clay brick on the West Elevation under the Portico.
- .5 Paint the new exterior bollard at the front entrance containing the accessible barrier free push button controls.
- .6 Refer to Finish Schedule for additional information.

3.11 Special Notes

- .1 Painting of repaired surfaces to include entire wall area from floor to ceiling in area of repair. Terminate paint at straight line where blending with existing is not possible.
- .2 New paint to be compatible with paint surfaces being applied over.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

- .1 This Section includes machine room-less electric traction elevator.
- .2 Work Required:
 - .1 The Work consists of labour, materials and services required for the complete installation (including operational verification) of all the equipment required for the elevator as herein specified.
 - .2 In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation.
- .3 Work by Others:
 - .1 Contractor to provide the following: Confirm length, width, and clear overhead dimensions for hoistway, and provide size as required, as approved by Engineer-Architect and elevator manufacturer.
 - .2 Contractor to provide all structural supports for guide rails and other mechanisms, as located by elevator manufacturer.
 - .3 Contractor to provide sill supports and grouting inside of hoistway for doors.
 - .4 Cab Floor Finishes: by Others.
 - .5 Card reader/keypad electronic access components; Refer to Division 27 for access requirements.
- .4 Design and construct elevator in accordance with CSA B44, local codes and regulations.

1.2 Related Work

- .1 Section 03 30 00 - Cast-In-Place Concrete: Elevator pit, foundation and hoistway walls.
- .2 Section 09 30 10 - Porcelain Floor Tiling: Cab floor finish.
- .3 Division 26 - Electrical:
 - .1 Main disconnects for each elevator.
 - .2 Electrical power for elevator installation and testing.
 - .3 Disconnecting device to elevator equipment prior to activation of sprinkler system.
 - .4 The installation of dedicated GFCI receptacles in the pit and overhead.
 - .5 Lighting in controller area, machine area and pit.
 - .6 Wiring for telephone service to controller and separate telephone line to elevator cab.
- .4 Division 21 - Fire Protection: The installation of fire and smoke detectors at required locations and interconnecting devices; fire alarm signal lines to contacts in the machine room.
- .5 Division 27: Telephone Systems and emergency communications equipment.

1.3 References

- .1 Canadian Standards Association (CSA)
 - .1 CSA B44, Safety Code for Elevators.
 - .2 CAN/CSA B651, Barrier-Free Design.
 - .3 CAN/CSA C22.1, Canadian Electrical Code.
- .2 American Society of Mechanical Engineers (ASME).

- .1 ASME A17.1 Safety Code for Elevators and Escalators.

1.4 Definitions

- .1 The term “substantial performance” as used herein, refers to the point in the progress of the work at which:
 - .1 The equipment has been functioning in trouble-free fashion for a one month period,
 - .2 The number of service disrupting call backs over the one month period averages less than 0.75 per elevator,
 - .3 The components function as specified, and
 - .4 The equipment provides service as intended.
- .2 The term “total performance” as used herein, refers to the point in the progress of the work at which:
 - .1 The equipment satisfies the conditions for substantial performance,
 - .2 The equipment has been functioning in trouble-free fashion for a three month period,
 - .3 The number of service disrupting call backs over the three month period averages less than 0.33 per elevator per month, and
 - .4 Progress payments have been authorized to 100%.
- .3 All terms in the specifications that are not otherwise defined shall have the definitions as given in CSA B44.

1.5 Certificates and Permits

- .1 Obtain and pay for certificates of approval and all other necessary permits and inspections.
- .2 Engineer-Architect will pay for annual licensing fee.
- .3 Prior to total performance, arrange for and pay for a safety inspection of the equipment by Authority Having Jurisdiction.

1.6 Submittals

- .1 Schedule: Submit shop drawings confirming required dimensions for the elevator hoistway, pits and machine room within 10 days of Contract Award. These submittals are required to allow Phase 1 work to continue without interruption. Remaining submittals may be submitted separately.
- .2 Submit eight (8) hard copies of the following. Each copy must be certified by authorized signature confirming compliance with specified requirements:
 - .1 Provide a list of personnel assigned to perform the Work and their qualifications. Identify the Site Foreman for this project.
 - .2 Product Data: Submit manufacturer’s product data for each system proposed for use. Include the following:
 - .1 Signal and operating fixtures, operating panels and indicators.
 - .2 Cab design, dimensions and layout.
 - .3 Hoistway-door and frame details.
 - .4 Electrical characteristics and connection requirements.
 - .5 Colour selection chart for Cab and Entrances.
 - .3 Shop Drawings: Submit approval layout drawings. Include the following:
 - .1 Car, guide rails, buffers and other components in hoistway.
 - .2 Maximum rail bracket spacing.
 - .3 Maximum loads imposed on guide rails requiring load transfer to building structure.
 - .4 Clearances and travel of car.
 - .5 Clear inside hoistway and pit dimensions.
 - .6 Location and sizes of access doors, hoistway entrances and frames.

1.7 Closeout Submittals

- .1 Submit eight (8) hard copies of the following. Each copy must be certified by authorized signature confirming compliance with specified requirements:
 - .1 Submit approved safety inspection report.
 - .2 Submit test data forms and reports for testing carried out by this Section and as follows:
 - .1 Include a check list of the items in the specifications as well as other performance data such as door times, operating times, brake-to-brake times, starting, running, stopping currents and voltages, slowdown and limit switch settings, governor settings, and, in general, settings of any adjustable devices.
 - .2 List safety devices, together with their settings and indicate whether they have been checked and adjusted.
 - .3 Include a check list of the dispatching system with the features listed and the test procedure used for each feature.
 - .4 Indicate auxiliary braking device and all recorded data, device designation, serial numbers, installation date, test date, seal number and such other similar information.
- .2 Provide maintenance manuals as follows:
 - .1 Supply to the Engineer-Architect three (3) sets of manuals describing in detail the operation of the equipment including special features, dispatching sequences, and such items as intercom systems and security systems.
 - .2 Describe the operation for special features such as independent service, Emergency Power service and Special Emergency service.
 - .3 Supply as built diagrams and drawings of operating panels (e.g. car panels, central control consoles) with descriptions of the function of switches and indicators.

1.8 Quality Assurance

- .1 Installer: Elevators will be installed by the manufacturer.
- .2 Site Foreman: The prime elevator mechanic responsible for the execution of the Work. The Site Foreman shall oversee all phases and work shifts of the Work, from initial startup meeting to Final Inspection.
- .3 The Site Foreman will not be assigned to another project site.

1.9 Regulatory Requirements

- .1 Supply equipment and do work in accordance with the National Building Code of Canada and CSA B44, including supplements. Where conflicts occur, the interpretation of the Elevator Inspector shall prevail.
- .2 Comply with CSA B651, Americans with Disabilities Act and CSA B44 Appendix E for barrier-free accessibility and arrangement of controls and fixtures.
- .3 Comply with all existing laws, codes, rules and regulations set forth by all appropriate Authorities Having Jurisdiction in the location where work is performed.
- .4 Only qualified elevator mechanics are to be employed in the performance of the work outlined in this specification while such elevator(s) is licensed and/or registered for public use.

1.10 Product Requirements

- .1 Only non-proprietary products are to be used on this project. The controller will be marked signifying that it is non-proprietary.

- .2 Miprom cards and components for the equipment shall be readily available to the open market with no qualifications or delays.
- .3 Ensure that all parts supplied for this project are sourced from manufacturers that will guarantee availability of replacement parts and components for a minimum of fifteen (15) years. When requested by the Engineer-Architect, submit manufacturer's company information indicating history, references and financial market status.
- .4 Where purchased components are used, ensure that the original manufacturer's name and component designation are clearly marked on the part or in the parts catalogue.

1.11 Project Conditions

- .1 Temporary Use of Elevators: The elevator shall not be used for building construction purposes except as directed after written acceptance of the complete installation by the Engineer-Architect.
- .2 If Contractor decides to use the elevators prior to completion of project, approval shall begin when elevators are accepted by Engineer-Architect. Temporary use will not be considered final acceptance by the Engineer-Architect or commencement of warranties.
- .3 Changes to Drawings and Specification:
 - .1 By bidding on this section, elevator contractor confirms that their elevator equipment will not exceed the horizontal and vertical space and dimensions provided on the drawings. Should the successful elevator contractor require the space and dimensions to be less than that shown, this may be accommodated after submission of clear and accurate drawings describing such adjustments, to the Engineer-Architect, prior to the construction of elevator pits. Any and all costs associated with changing the floor plans and vertical assemblies, for both design and construction, to permit the above, shall be the responsibility of the elevator contractor.
 - .2 Review shaft size, pit and over-travel dimensions shown on the Drawings and state in a letter with the bid if changes are required to accommodate manufacturer's standard equipment.
 - .3 Failure to furnish such statements will be interpreted to mean that elevator contractor agrees to meet all requirements under this Section, and conflicts with the work of other trades will not result in added expense to Engineer-Architect.

1.12 Delivery, Storage and Handling

- .1 Deliver elevator materials, components and equipment in manufacturer's protective packaging.
- .2 Store materials in a dry protected area provided by others. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling, or deterioration.

1.13 Warranty

- .1 Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 Acceptable Products

- .1 Otis Gen2.
- .2 ThyssenKrupp Synergy.

- .3 Kone Ecospac.

2.2 System Characteristics

- .1 Quantity of Elevators: 1.
- .2 Refer to Drawings for number of stops per elevator, travel distance between stops, total travel, floor plan, number of openings and door configurations.
- .3 Elevator:
 - .1 Rated Capacity: (2500 lbs).
 - .2 Rated Speed: 1.02 m/s (150 fpm)
 - .3 Cab Height: 2438 mm
 - .4 Entrance Type and Width: Single-Slide Door 1067 mm.
- .4 Main Power Supply: 600 Volts, 3 Phase, with a separate equipment grounding conductor.
- .5 Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
- .6 CSA B651 Compliance: Elevator and controls to meet all requirements of CSA B651.
- .7 Provide equipment according to seismic zone: 1.
- .8 Flooring: Hard tile by Section 09 31 00; Refer to Finish Schedule for locations.

2.3 Operation

- .1 Automatic operation by car and hall buttons. During system activity, one car will park at pre-selected landing. Free car to remain at last landing served. Only one car to respond to a hall call. Where either car is removed from service, other car to answer all hall calls and its own car calls.
- .2 Operating Features: Provide the following:
 - .1 Special Emergency Service Phase I and II – Emergency Recall and In-Car Emergency Operation.
 - .2 Full Collective Operation
 - .3 Anti-nuisance.
 - .4 Fan and Light Protection.
 - .5 Load Weighing Bypass.
 - .6 Independent Service.
 - .7 Top of Car Inspection.
 - .8 Access at bottom landing with zoning.
 - .9 Access at top landing with zoning
 - .10 Remote Elevator Monitoring
- .3 Door Control Features: Provide the following:
 - .1 Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
 - .2 Elevator doors provided with reopening device to stop and reopen the car doors and hoistway doors automatically should doors become obstructed.
 - .3 Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.
- .4 Provide equipment that is designed to meet the 2010 NBCC provisions.

2.4 Control Room Components

- .1 Controller, non-proprietary: A microcomputer based control system to perform functions of safe elevator operation, and car and group operational control. Controllers to be designed and tested for Electromagnetic Interference (EMI) immunity.
- .2 Drive: Variable Voltage Variable Frequency AC drive system.

2.5 Equipment: Machine, Governor and Hoistway

- .1 Machine: AC gearless machine, with a synchronous permanent-magnet motor, dual solenoid service and emergency disc brakes, mounted at the top of the hoistway.
- .2 Governor: tension type governor.
- .3 Buffers, Car and Counterweight: Oil type buffers.
- .4 Hoistway Operating Devices:
 - .1 Emergency stop switch in the pit
 - .2 Terminal stopping switches.
- .5 Positioning System: Encoder, reader box, and door zone vanes.
- .6 Guide Rails and Attachments: Tee-section steel rails with brackets and fasteners. Side counterweight arrangements to have dual-purpose bracket with counterweight guide rails and car guide rails to building fastening.
- .7 Hoisting Beams: Hoist beams are to be designed, supplied and installed by the elevator contractor; to be installed by general contractor.
- .8 Coated Steel Belts: Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords.
- .9 Governor Rope: Steel, eight strands, wound about sisal core center.
- .10 Fascia: Galvanized sheet steel.
- .11 Hoistway Entrances:
 - .1 Frames: Stainless steel, bolted construction for one-piece unit assembly, securely fastened to fixing angles mounted in the hoistway, ULC fire rated.
 - .2 Sills: Extruded aluminum.
 - .3 Doors: Hollow metal construction with vertical internal channel reinforcements.
 - .4 Fire Rating: Entrance and doors ULC fire rated for 1-1/2 hour.
 - .5 Entrance Door Finish: Satin finish stainless steel.
 - .6 Entrance marking plates: 102 mm x 102 mm plates, raised floor markings with Braille located adjacent to floor marking. Marking plates located on both sides of entrance.
 - .7 Sight Guards: Black sight for metal finish door.

2.6 Equipment: Car Components

- .1 Car frame and Safety: Fabricated from formed or structural steel members designed with adequate bracing to support platform and car enclosures. The car safety to be integral to the car frame, Type B, flexible guide clamp type.
- .2 Cab Finish: Steel walls with 6WL Stainless Steel finish.
- .3 Car Front Finish: Stainless steel.

- .4 Car Door Finish: Stainless steel.
- .5 Ceiling Type: Down light suspended ceiling, satin stainless steel finish, with LED pot lights (6 lights).
- .6 Emergency Car Lighting: Emergency power unit, 6-volt sealed rechargeable battery and static circuits.
- .7 Emergency Pulsating Siren: activated when Alarm button is engaged, rated sound pressure level of 80 dB(A) at a distance of 3.0 m from the device.
- .8 Fan: two-speed 120 VAC fan mounted to the structural ceiling, airflow rates of 5.8 and 7.4 m³ /min on low and high setting. Rubber mounted to prevent the transmission of structural vibration, with baffle to diffuse audible noise. Provide switch in car-operating panel.
- .9 Handrail: located on all walls without doors, round 40 mm diameter satin stainless steel, capped ends. Mounting height 810 mm from finished floor.
- .10 Threshold: aluminum.
- .11 Emergency Exit Contact: provided on car-top exit.
- .12 Roller Guides: Mounted on top and bottom of car and counterweight.
- .13 Platform: 2 layers of plywood and 2 layers of 0.80 mm thick aluminum laminate for total thickness of 38 mm. Mount load weighing device under platform.
- .14 Certificate frame: Provide Certificate frame with satin stainless steel finish.

2.7 Equipment: Signal Devices and Fixtures

- .1 Car Operating Panel:
 - .1 General: Main car control in each car to be barrier-free design, containing operation devices mounted in stainless steel no. 4 integral swing return panel. Provide modules for optimum viewing and accessibility.
 - .2 The lowest module to contain "door open", "door close", "alarm" buttons and a keyed "emergency stop" switch.
 - .3 Intermediate modules to contain floor buttons which illuminate. Raised floor indications and accessibility symbols to be located adjacent to floor buttons.
 - .4 Next module to contain required switches.
- .2 Position indicator: Provide a position indicator, mounted in a module matching the control panel.
- .3 Emergency car lighting: Provide emergency lighting unit with battery charging unit and two lamps capable of providing 10 lx illumination for up to four (4) hours.
- .4 Emergency communications system: Barrier-free design telephone cabinet mounted in the swing return, with telephone symbol 75 mm in height and wording "In case of emergency, lift receiver, wait for answer" in both official languages. Identify elevator and name of building on back of cabinet cover. Include telephone wiring within elevator hoistway.
- .5 Special Accessories:
 - .1 Firefighter's hat and Firefighter's Phase II Key-switch
 - .2 Independent service switch.
 - .3 Inspection switch.
 - .4 Two speed fan/light switch.
 - .5 Protective pads and hooks for all walls without doors. One set for each elevator.
 - .6 Signage: Provide engraved sign "Do Not use Elevator in case of Fire - Use Stairs" within cab and beside

elevator entrance on each floor. Provide engraved sign "Elevator not to be used by construction personnel" and "Elevator permit on file with manager" in cab. All signage to be in both official languages.

- .6 Hall Fixtures: Barrier-free push buttons and key switches for elevator operation. Round mechanical buttons in flush mount face frame with vandal resistant buttons. Buttons to be flat flush in vertically mounted fixture. Hall lanterns and position indicators to be illuminated by LED. Satin stainless steel finish.
- .7 Hall Lanterns and Chime: Barrier-free directional lantern visible from corridor at each hall entrance. When car stops and doors are opening, the lantern to indicate direction of travel and chime will sound.
- .8 Hall Position Indicator: Provide at Ground Floor entrances.
- .9 Emergency (standby) Power key-switch: Manual selection of each elevator in normal operation after automatic return in standby power operation has been initiated.

PART 3 - EXECUTION

3.1 Examination

- .1 Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed.
- .2 Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- .3 Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 Preparation

- .1 Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.3 Installation

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions, and data sheet.
- .2 Install hoistway equipment, machine room equipment, and all other elevator materials and components in accordance with CSA B44, local codes, regulations and manufacturer's written instructions.
- .3 Install elevator systems components and coordinate installation of hoistway wall construction.
- .4 Work to be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
- .5 Comply with the National Electrical Code for electrical work required during installation.
- .6 Supply for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.
- .7 Welded construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn Parts. Comply with AWS standards for workmanship and for qualification of welding operators.

- .8 Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Engineer-Architect, to ensure dimensional coordination of the work.
- .9 Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.
- .10 Sound isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and eliminate sources of structure-borne noise from the elevator system.
- .11 Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.
- .12 Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascias and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.
- .13 Lubricate operating parts of system, including ropes, as recommended by manufacturer.

3.4 Testing

- .1 Perform and meet tests required by CSA B44.
- .2 Supply instruments and execute specific tests.
- .3 Furnish test and approval certificates issued by jurisdictional authorities.
- .4 After completion of the work and prior to substantial performance, submit a completed test data form, signed by the person responsible for the performance of the work, certifying that the unit is complete and ready for inspection.
- .5 Provide testing as follows, as minimum:
 - .1 Full load overspeed car safety tests if car safeties are provided;
 - .2 Empty car overspeed counterweight safety tests if counterweight safeties are provided;
 - .3 Full load full speed car buffer tests if oil buffers are provided;
 - .4 Empty car full speed counterweight buffer tests if counterweight oil buffers are provided;
 - .5 Full load full speed down direction brake tests if a traction machine is provided;
 - .6 Electrical safety circuit check;
 - .7 Door pressure tests;
 - .8 Tests of any other safety devices.
- .6 Safety Tests: Arrange the safety so that the car stops at both no load and full load on a safety test without excessive acceleration and without damage to the equipment.
- .7 Should more than one inspection for a license or approval be required due to deficient work, assume the cost of the additional inspections.

3.5 Cleaning

- .1 Remove protective coverings from finished surfaces and components.
- .2 Clean surfaces and components ready for inspection.

3.6 Adjusting

- .1 Adjust door opening and closing times to suit handicapped users in accordance with manufacturer's instructions.
- .2 Adjust control system to cause elevators to answer hall calls during working day within performance criteria specified.
- .3 Adjust for smooth acceleration and deceleration of car as so not to cause passenger discomfort.
- .4 Adjust automatic floor levelling feature.

3.7 Demonstration

- .1 Arrange with the Engineer-Architect to provide training for the Owner's staff.
- .2 Allow 8 hours of training time.
- .3 Include in the training, a complete review of the documentation, operation of the equipment and demonstration of any special features.

3.8 Acceptance

- .1 A Certificate of Substantial Completion will not be issued until substantial performance, as defined by this Section, has been achieved.
- .2 A Final Certificate of Completion will not be issued until total performance, as defined by this Section, has been achieved.

END OF SECTION

PART 1 ADMINISTRATION

1.1 Reference

- .1 This Section supplements Division 01, and forms part of every Section of Division 26, 27 and 28.

1.2 Codes and Standards

- .1 Complete the installation of the work in accordance with latest adopted editions of the National Building Code, Canadian Electrical Safety Code, C.S.A., U.L.C., NECB, N.F.P.A. or other Codes, as required.
- .2 Comply with Electrical and Building Code(s) Bulletins in force at time of Bid submission. While not identified and specified by number in this Division, they are to be considered as forming part of related Standards.
- .3 Abbreviations for electrical terms are as per C.S.A. Z85.
- .4 Comply with CSA Z460 – Control of hazardous energy-lockout and other methods.
- .5 Comply with CSA Z462 – Workplace electrical safety.

1.3 Definitions

- .1 Wherever the words "install", "provide", or "supply and install", are used, it shall be understood to mean "provide and install, inclusive of all labour, materials, installation, testing, and connections" for the item to which referred.
- .2 "Concealed" is defined as "out of sight" in "normal" viewing conditions, and includes buried in concrete, above acoustic tile or gypsum board ceilings, within masonry or gypsum board constructed walls, within cable trays or below raised access floors.

1.4 Permits and Fees

- .1 Submit to the local Electrical Inspection Department and Local Utility the necessary number of Electrical Drawings and Specifications for examination, special inspection and/or approval, prior to the commencement of the work, and pay all costs and associated fees. If required, prepare any additional drawings/ documents required by the Authority.
- .2 The Engineer-Architect will provide, upon request, the required quantity of drawings and specifications at no cost.
- .3 Notify Engineer-Architect of changes required by Electrical Inspection Department prior to making changes.
- .4 Arrange for the timely installation of the permanent electrical and telephone service, and comply with all of the Authorities requirements. Inspect the site for any potential coordination issues with service authorities during tendering process.

1.5 Existing Conditions

- .1 Visit the site and examine the existing conditions affecting the work of this Division. Ignorance of existing conditions will not be considered as basis for extra claims.

1.6 Contract Drawings

- .1 The Drawings for the Electrical work are diagrammatic performance Drawings only, intended to convey the scope of work and indicate the general arrangement and approximate location of apparatus and fixtures, and the approximate sizes and locations of equipment and outlets. The Drawings do not intend to show Architectural, Mechanical or Structural details.
- .2 Make, at no additional cost, any changes or additions to materials and equipment necessary to accommodate Structural conditions (offsets around beams, columns, etc.).
- .3 Alter at no additional cost, the location of materials and/or equipment as directed, provided that the changes are made before installation, and do not necessitate additional materials.
- .4 Verify that the spaces in which the equipment is to be installed is sufficient and install all equipment to maintain head room and clearances, to conserve space, comply with codes, and to ensure adequate space for future servicing.
- .5 No claim for extra payment to be made for extra material or work made necessary by circumstances encountered due to conditions which were visible upon, or reasonably inferable from, such examinations of drawings, documents, premises and associated systems prior to submission of the response.
 - .1 The accompanying cable routing diagrams are diagrammatic only depicting the cable routing requirements and cable connectivity requirements. They are not installation drawings. Make all necessary allowances in the tender price to achieve the intent of the drawings. No claim for extra payment to be made for extra material or work made necessary by circumstances encountered due to conditions which were visible upon thorough examination and review of the associated project documents.
- .6 Change location of devices, zone boxes and termination panels at no extra cost providing cable length increase resulting from said relocation does not exceed 3 metres and information is given prior to installation of said outlet, cable or termination panel.
- .7 Leave space clear and install equipment to accommodate future materials and/or equipment as indicated or specified, or to accommodate equipment and/or materials supplied by other trades.
- .8 Confirm at the site, the exact location of equipment, outlets, and fixtures, and the location of outlets for equipment supplied by other vendors and trades before installation.
- .9 Notify the Engineer-Architect of any discrepancies in the specifications and/or drawings. In the event of a discrepancy, the Contractor to be responsible for the condition of greatest value until the Engineer-Architect has an opportunity to review the discrepancy and issue an instruction.

1.7 Intent

- .1 It is the intent of these drawings and specifications that the Contractor provide complete and operational systems as required.
- .2 Where differences occur, the maximum condition shall govern.
- .3 Any miscellaneous items, hardware, devices, wiring, etc., not specifically described, but required for the operation of the system, must be provided and included as part of the Tender. All additional components used must be clearly detailed on As-Built drawings.

1.8 Document Coordination

- .1 The Electrical Contractor shall totally review all architectural, structural and mechanical drawings and specifications to coordinate and determine work associated with electrical work prior to submitting tender price. Also, review all Addendums associated with all trades.
- .2 After review of all documents associated with other trades, forward any questions and obtain answers by Addendum, prior to tender submission.
- .3 Submission of tender by Electrical Contractor acknowledges coordination with other trades as part of these contract documents.
- .4 Whenever differences occur between plans and diagrams or schematics, and between specifications and diagrams, the maximum condition shall govern, and the tender shall be based on whichever is the greater amount.

1.9 Location of Devices

- .1 Locate receptacle, telephone outlet from dimensional Architectural elevation drawings where applicable. Do not install outlets back-to-back in walls, but allow one concrete block width horizontal clearance between boxes. Where installed with gypsum board, allow minimum 900mm horizontal clearance between boxes. Coordinate all device locations with architectural wall finishes to ensure devices can be properly mounted where indicated. Notify Engineer-Architect of any site conflicts prior to rough-in.
- .2 Change location of devices at no extra cost or credit, providing distance does not exceed 3m and information is given before installation.
- .3 Locate light switches on latch side of doors, unless otherwise shown.
- .4 Where devices are shown adjacent to one another in plan but occur at different elevations, they are to be vertically aligned.
- .5 Where receptacle, telephone, data or additional communications devices are shown adjacent to one another on the drawings, they are to share a common bracket and be spaced 150mm apart on center.

1.10 As-Built Drawings

- .1 Provide As-Built drawings of the installation incorporating all changes from the contract drawings. Refer to Division 01 for details.
- .2 As-built drawings to include the final layout and location of all electrical equipment devices, outlets and pull boxes installed.
- .3 As-built drawings to include routing of all electrical services such as feeders, and branch wiring for all electrical systems as noted in Division 26, 27 and 28 contract documents.
- .4 A complete and separate set of white prints is to be kept on the site and up to date at all times.
- .5 These prints to be marked up to record clearly, neatly, accurately and promptly, all locations of Electrical work, deviations from and changes to the "Issued for Construction" Documents.
- .6 The accurate locations, depth, size and type of each underground utility and service line to be recorded before concealment, to ensure accurate and future direct access to these buried services. Dimensioning on 'record' drawings shall refer to the building or other permanent fixtures for future reference.

- .7 The Record Drawings will be reviewed at regular intervals by the Engineer-Architect and will be taken into consideration when reviewing the monthly applications for progress payment.

1.11 Schedule

- .1 Overtime work and work outside normal work hours as deemed necessary to accomplish scheduling are the responsibility of the Contractor and must meet the requirements of the Department of Public Safety. All costs resulting from such overtime must be included in the Contractor's Total Tender Price.

1.12 Expediting

- .1 Continuously check and expedite delivery of all materials and equipment required for the successful execution of the work.
- .2 If requested by the Engineer-Architect, inspect at the source of manufacture, to confirm status, and submit an itemized flow chart of equipment order and delivery dates.
- .3 Continuously check and ensure that the necessary information is communicated to all parties involved.
- .4 Immediately inform the Engineer-Architect in writing of any anticipated delays.

1.13 Progress Claim

- .1 Upon award of contract, the Electrical Contractor is responsible for providing an itemized breakdown of Electrical Contract as per the following list. Monthly progress claims are to be presented in this format:

Description		Contract Amount (\$)	Value of Work Complete (\$)	Percentage of Work Complete (%)	Less Prior Claims	Current Claim
1	Mobilization					
2	Rough-In					
	a Supply					
	b Install					
3	Wiring Devices					
	a Supply					
	b Install					
4	Power Distribution/Wiring					
	a Supply					
	b Install					
5	Light Fixtures/Controls					
	a Supply					
	b Install					
6	Fire Alarm					
	a Supply					
	b Install					

(Cont'd)

Description		Contract Amount (\$)	Value of Work Complete (\$)	Percentage of Work Complete (%)	Less Prior Claims	Current Claim
7	Approved Change Orders					
	1					
	2					
	3					
	4					

Totals

Less Holdback:
Net Amount of this Claim:
HST:
Total Amount of this Claim:

PART 2 PROJECT COORDINATION

2.1 Concrete

- .1 It is the responsibility of the Electrical Contractor to advise the General Contractor of all required concrete and formwork for bases, curbs and ductbanks required for the work of this Division prior to tender closing.

2.2 Concrete Bases

- .1 ALL FLOOR MOUNTED EQUIPMENT to be installed on a 100mm high concrete base by Division 03. Concrete base to extend 53mm on all sides with chamfered corners.
- .2 It is the responsibility of the Electrical Contractor to advise the General Contractor of the number, size and locations of all required pads.

2.3 Core Drilling

- .1 Refer to structural specifications and drawings for requirements of core drilling of concrete walls and floors. Openings 100mm and larger to be sleeved prior to concrete pour. Opening less than 100mm may be core drilled. Exterior wall penetrations to be sealed with Link-Seal® modular seals or approved equal.

2.4 Access Doors

- .1 Access doors for furred ceilings or spaces for servicing equipment and accessories or for inspection of safety, operating or fire devices for installation under section erecting the walls or ceilings. Provide general contractor with number, type, size and locations prior to tender close.
- .2 Access doors shall be flush mounted (600 x 600)mm for body entry and (300 x 300)mm for hand entry unless otherwise noted. Doors shall open 180 degrees, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps. Steel shall be prime coated. Doors shall be of

approved manufacturer with published literature. Door flanges to have prepunched holes so that drywall compound will conceal flange and only steel door is visible.

- .3 Access doors to be supplied and installed to Section 08 31 00 – Access Doors and Panels.

2.5 Plywood

- .1 Supply and install all plywood backboards required for the work of this Division. Plywood to be highest quality fire retardant fir, 19mm thick unless otherwise specified.
- .2 Plywood backboards are to be used for mounting the following surface wall mounted equipment thereon:
 - Tele/Data Equipment
 - Disconnect Switches
 - Fire Alarm Control Equipment
 - GFI Equipment
 - Junction Boxes 600mm square and larger
 - Pull Boxes
 - Wall Mounted Switchgear
- .3 Where practical, group devices on a common backboard.
- .4 Plywood backboards to be ULEF or NAF when used within building envelope.

2.6 Temporary Electrical Service

- .1 Temporary electrical service to be provided by Division 01. Refer to Division 01 for detailed information.
- .2 Provide extension cords, extension lighting and equipment required for the work of this trade. The cost of this work to be included in the Bid Price.

2.7 Warning Signs

- .1 Provide warning signs, as specified to meet requirements of Inspection Department and Engineer-Architect.
- .2 Use decal signs, minimum 175mm x 250mm in size.

2.8 Protection

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark live parts 'LIVE 600 VOLTS', or with appropriate voltage.
- .3 Install doors for temporary storage rooms containing the Contractors non-installed electrical equipment. Keep these doors locked, except when under direct supervision of electrician.
- .4 The Electrical Sub-Contractor's qualified Superintendent, to be present for all concrete pours in order to witness and accept responsibility for protection of equipment.

2.9 Project Waste Management

- .1 Contractor must adhere to project waste management guidelines as detailed in Section 01 74 19 – Waste Management and Disposal.

PART 3 QUALITY ASSURANCE

3.1 Shop Drawings

- .1 Submitted shop drawings must indicate equipment name or reference number, details of construction, catalogue sheets, colour photos, dimensions, scale, capacities, weights and electrical performance characteristics of equipment or materials, as well as specification reference section number, and project name.
- .2 Shop drawings to be provided with sufficient space on the front for all Engineer-Architect's and Contractor's "review" stamps.
- .3 Work affected by submittal shall not proceed until review is complete.
- .4 Review submittals prior to submission to Engineer-Architect. 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 the work and Contract Documents and bears Stamp of Contractors.
- .5 Corrections made to the Shop Drawings by the Engineer-Architect will not affect the Contract Price.
- .6 Submit Shop Drawings for all material and equipment referred to in contract document:
 - Emergency Lights
 - Fire Alarm System
 - Ground Fault Circuit Interrupters
 - Lighting Controls
 - Luminaires
 - Motor Starters
 - Moulded Case Breakers
 - Transformers
 - Wiring Devices
 - Other Electrical Equipment
- .7 Submit shop drawings for the following equipment, for general review of Electrical requirements only:
 - Elevator
 - All mechanical equipment requiring individual electrical servicing.

3.2 Materials and Equipment

- .1 Provide materials and equipment in accordance with Division 01. All materials and equipment to be new, C.S.A. certified, and manufactured to the Standards specified.
- .2 Where there is no alternative to supplying equipment which is not C.S.A. certified, obtain special approval from the local Inspection Department.
- .3 Factory assemble control panels and component assemblies.
- .4 All equipment must fit into the space and configuration allocated. The Contractor to be responsible for resolving any increase in space requirements or configuration difficulties, due to non-conformity of said condition.
- .5 The Contractor to ensure that all carried products, are completely physically and electrically compatible.

3.3 Finishes

- .1 All shop finished metal equipment and enclosure surfaces, must be prepared by removal of rust and scale from the raw metal, degreasing, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel paint. Use factory standard colours unless otherwise specified. Colour reference numbers are Sico.
- .2 Clean, prime and paint exposed conduit, hangers, racks, and fasteners, to prevent rusting. Colour to be Black, 10684.
- .3 Clean and touch-up surfaces of shop finished equipment that is scratched or marred during shipment or installation, so as to match original paint.
- .4 Turn over to the Owner, 1l. (0.22 gal.) of paint of each colour used, in the form of liquid or spray, to allow for future touch-up of damaged areas.

3.4 Field Supervision and Workmanship

- .1 Workmanship throughout to conform with the highest standards applicable.
- .2 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentice program to be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted to be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .3 The work of this division to be carried out by a contractor who holds a valid electrical contractor license as issued by the province that the work is being constructed.

3.5 Field Quality Control

- .1 Conduct and pay for tests of the following:
 - .1 Power distribution system, including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors and associated control equipment, including sequenced operation of systems where applicable.
 - .5 Systems - fire alarm system, communications, etc.
- .2 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .3 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350V with a 500V instrument.
 - .2 Megger 350-600V circuits, feeders and equipment with a 1000V instrument.
 - .3 Check resistance to ground before energizing.
- .4 Advise Engineer-Architect prior to carrying out tests to ensure Engineer-Architect's presence is not required.
- .5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .6 Submit test results for Engineer-Architect's review.

3.6 Notification for Site Review

- .1 Notify the Engineer at the following stages of construction for review of the installation or witnessing of tests:
 - .1 Wall rough-in before insulation and drywall begins.
 - .2 Above ceiling installation before ceilings are closed in.
 - .3 Transformers before closing and energizing.
 - .4 Fire alarm certification.

3.7 Identification

- .1 Identify all electrical, tele/data and security equipment and wiring.
- .2 Coordinate identification of mechanical equipment, with Mechanical Contractor to ensure identical names, and designations are used.
- .3 Wording on nameplates and labels to be approved by the Engineer-Architect to be in English.
- .4 Allow for an average of 50 (fifty) letters per nameplate and label.
- .5 Use nameplates for:
 - .1 Transformers, indicating primary and secondary voltage, phase, and number of wires, designation and location of feed.
 - .2 Lamicaid nameplates installed on combination starters, magnetic starters, manual starters and all various system controls, control panels, and disconnect switches shall contain the following information in the following order:
 - .1 Designated name of equipment.
 - .2 Voltage(s), number of phases and wires.
 - .3 Branch circuit breaker number(s).
 - .3 Tele/data, F.A. panels, fire alarm modules, and other equipment indicating system and voltage. Refer to Division 27 for specific tele/data identification requirements.
- .6 Nameplates to be lamicaid, 3mm thick, plastic engraving sheet, white face and a contrasting black core and must be securely fastened to equipment by adhesive backing. Size to be 25mm x 100mm with 1 to 3 lines of 6mm high letters.
- .7 Wiring Identification:
 - .1 Identify branch circuit wiring including neutral conductors at both ends, including in all junction boxes located in between with permanent indelible identifying markings, indicating panel and circuit number (i.e., A1-25).
 - .2 Maintain phase sequence and colour coding throughout.
 - .3 Colour code: to CSA C22.1.
 - .4 Use colour coded wires in communication cables, matched throughout system.
- .8 Conduit and Cable Identification:
 - .1 Colour code conduits, boxes and metallic sheathed cables during installation.
 - .2 Code with Plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15m intervals.
 - .3 Provide framed colour schedule adjacent to the single line electrical riser diagram in the electrical room.
 - .4 Colours: 25mm wide prime colour and 20mm wide auxiliary colour.

	Prime	Auxiliary
250V to 749V Normal	Blue	
50V to 249V Normal	Green	
Telephone (wired and wireless)	White	
Fire Alarm	Red	

Emergency Voice Controls	Red Brown	Black Orange
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- .9 Use plastic self-adhesive tape to identify incoming utility source lines, feeders, subfeeders and bus work in each switchboard and unit sub-station.
 - .1 Unless otherwise specified, tape colour code to be as follows:

Red	-	Phase A
Black	-	Phase B
Blue	-	Phase C
White	-	Neutral
Green	-	Ground
- .10 Complete all panelboard and security (DGP and terminal boxes) directories with neat, type written list of circuit numbers and item controlled.
- .11 Identify the isolated ground conductors with green tape both at the outlet box and the junction box when using 3 conductor "AC90" cable to isolated ground "IG" receptacles.
- .12 All light switches, lights, receptacles, manual starters, direct connected equipment, etc., are to have its panel and circuit identified with a lamicoïd nameplate or a Brady foam backed raised label. Black letters on white background, 6mm high x 25mm long (ie. A-3 or A-2,4,6). Nameplates to be properly secured to coverplate or equipment.
- .13 All junction and/or pull boxes shall be marked with an indelible ink marker to designate the circuit number of enclosed wiring, the designated panel name and electrical characteristics where applicable.
- .14 Install an additional 'lamicoïd' nameplate on all, or any piece of electrical equipment, or apparatus, ie. main switchboard, CDP panels, panelboards, motor control centres and fusible switches, etc. that may contain overcurrent devices, i.e., circuit breakers and/or fuses that have been designed for and incorporate an interrupting capacity sized 'larger' than 10 kAIC.

Examples:

Minimum interrupting capacity of breakers installed in this panel is to be not less than 22kAIC.

Minimum interrupting capacity of fuses installed in this MCC is to be not less than 100 kAIC.

- .15 All low voltage cables to be of the following colour:

Telephone	Match Existing
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3.8 Coordination of Protective Devices

- .1 Ensure circuit protective devices such as overcurrent relays, and fuses, are installed to values and settings as indicated.

3.9 Noise and Vibration

- .1 Electrical equipment is to operate without objectionable noise or vibration. If, in the opinion of the Engineer-Architect, the equipment operates with excessive noise or vibration, then the equipment must be replaced, or noise or vibration eliminated.

- .2 Connections to noise-producing and vibrating equipment must be made with flexible conduit. This includes transformers (both power and distribution), and motors. Use a minimum of 1m of flexible cable at each device.
- .3 Vibration isolators are to be provided where indicated or required. Transformers to be isolated from the structure, with spring and rubber isolators when wall mounted or suspended and 12mm high density neoprene sandwich pads (type MWP) when floor mounted and not integral to the transformer between the frame and core.

PART 4 CONSTRUCTION DETAILS

4.1 Conduit and Cable Installation

- .1 Install conduit, and sleeves, prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 100mm.
- .2 Install cables, conduits and fittings to be embedded or plastered over neatly and close to building structure so furring can be kept to a minimum.

4.2 Inserts, Hangers and Sleeves

- .1 Provide hangers, inserts, sleeves and supports as required.
- .2 Inserts are to be of lead shield type.
- .3 Hangers must not be welded to structural steel members and burning of holes in structural steel is prohibited.
- .4 Sleeves in new construction are to be of a type suitable for the application and be sealed and made watertight. Sleeves through concrete to be sized for free passage of conduit, and installed flush with underside of concrete slab and extend 100mm above finished floor unless otherwise shown.
- .5 Be responsible for the installation of sleeves in accordance with the Construction Schedule.

4.3 Owner/User Supplied Equipment

- .1 Where specified install all equipment provided by the Owner/User.
- .2 Receive, store and install equipment, and accept full responsibility for it and its correct operation.

4.4 Mounting Heights

- .1 Mounting height of equipment is from finished floor to centre line of equipment unless specified or indicated otherwise. Where mounting heights vary from noted standard, seek clarification from Engineer-Architect.
- .2 If mounting height of equipment is not indicated, verify with Engineer-Architect before proceeding with installation.
- .3 Local switches: 1050mm
- .4 Wall receptacles: vertically
 - Above floors: 400mm
 - Above top of continuous baseboard heater: 200mm

In mechanical rooms: 1400mm

- .5 Telephone outlets above floor: 400mm vertically
- .6 Fire alarm pull stations: 1150mm
- .7 Emergency lighting: at underside of ceiling
- .8 Mechanical sensor box: 1250mm

4.5 Mechanical/Electrical Responsibilities

- .1 The following is a list of mechanical and electrical responsibilities for the above-mentioned project:
 - .1 Electrical Contractor will be responsible for the complete supply, installation, and wiring of starters, except for equipment containing built-in starters and variable speed drives. Electrical Contractor will supply and install all feeders to the line side and load side of each starter. For equipment containing built-in starters, Electrical Contractor will provide power and connect the unit terminals.
 - .2 Electrical Contractor to provide all remote disconnect switches.
 - .3 All control wiring (including BAS) except fire alarm shall be by Mechanical Contractor, regardless of voltage.
 - .4 Voltages for motors 3/4 HP and larger will be 600V, 3 phase. Anything smaller will be 120V single phase or 208V 1 or 3 phase.
 - .5 All motors shall be provided by Mechanical Contractor.
 - .6 No two-speed double winding motors are to be used unless Mechanical Contractor gives prior notice to Electrical Contractor.
 - .1 Mechanical Contractor to provide thermistor protection on motors 15 HP and larger using approved thermistors.
 - .2 Thermistors will be provided by Mechanical Contractor.
 - .3 Electrical Contractor to provide manual reset devices for motor starters for thermistor interface. (Only for starters that are provided by Electrical Contractor).
- .2 All fire alarm work to be done by Electrical Contractor. Electrical Contractor will provide all fire alarm relays for interface to elevator control wiring.
- .3 All level switches for sump pumps will be wired by Mechanical Contractor.
- .4 Electrical Contractor shall provide 120V to locations indicated where power circuits are required for mechanical control systems, ie. BAS panels, etc.
- .5 Electrical power and control wiring for mechanical equipment and systems shall comply with the requirements set out in Division 26, 27 and 28 Specifications.

4.6 Voltage Ratings

- .1 Operating voltages to be as indicated in C.S.A. C235.
- .2 Motors, electric heating, control and distribution devices and equipment must operate satisfactorily at 60 Hz, and within the operating limits established by the above Code, without damage to equipment.
- .3 Motors supplied by all Divisions, up to and including 375W (1/2HP) to be 120V, 1ph, and 562W (3/4HP) and larger to be 600V, 3ph unless otherwise specified.

4.7 Sealing/Fireproofing

- .1 Where cables or conduits pass through non fire-rated floors, walls or roof, provide internal and external sealing thereto.
- .2 Seal all empty conduits at both ends.
- .3 Refer to Division 07 for precise methods and requirements.
- .4 Electrical Contractor is responsible for verifying size and number of locations required for electrical systems and advising Division 07 Contractor.
- .5 Fire-stop sleeves to be Hilti #CP653 (103mm) or approved equal.
- .6 Smoke and acoustic sleeves to be Hilti #CS-SL SA (103mm) or approved equal.

PART 5 CONTRACT CLOSE-OUT

5.1 Completion of Contract

- .1 All the equipment must be cleaned and tested before final acceptance by the Engineer-Architect.
- .2 Defects and deficiencies which originate or become evident during the warranty period must be repaired or replaced, at no cost.
- .3 If, during the warranty period, transformers, drivers or other noise and vibration producing equipment are considered by the Engineer-Architect to exceed acceptable standards, then these must be replaced without delay or additional cost to the Owner. All work relating to the replacement of defective items must be carried out after normal working hours and at a time which is acceptable to the Owner.

5.2 Cleaning

- .1 Do final cleaning in accordance with Division 01.
- .2 Clean luminaire reflectors and lenses, lamps, and other surfaces that have been exposed to construction dust and dirt. Clean the insides and outsides of panelboards, splitters and other electrical equipment, and completely remove all debris and tools from the project.

5.3 Owner/User's Instruction and Trial Usage

- .1 Arrange and pay for the service of the manufacturers' factory service technician to instruct the Owner/User and operating personnel in the startup, operation, care and maintenance of all the equipment and make provisions for all training to be video recorded. All equipment to be tested and commissioned before instruction. Provide sheets for signatures of Owner/User and operating personnel present at each instruction period and turn over recorded training on USB flash drive.
- .2 Arrange and pay for the service of the manufacturer's factory service technician to supervise the start-up of his equipment installation, and to check, adjust, balance and calibrate components.
- .3 Provide these services for such period, and for as many visits as necessary to ensure that the operating personnel are conversant with all aspects of its care and operation (all visits must be recorded).

- .4 The operating personnel must be permitted to operate the systems under the contractor's supervision for a reasonable period of time prior to Substantial Completion of Contract. This use shall not be misconstrued as acceptance of the equipment.

5.4 Operation and Maintenance Manuals

- .1 Provide operation and maintenance manuals as per Division 01.
- .2 Include the following information in the Operations and Maintenance manuals:
 - .1 Names and address of local suppliers for the items included.
 - .2 Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of the installation.
 - .3 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature is not acceptable.
 - .4 The Engineer-Architect reviewed shop drawings.
 - .5 Work report c/w dates from Electrical Inspection Department including electrical permit associated with the project.
 - .6 Fire alarm verification reports.
 - .7 Warranty letters from contractors and suppliers.
 - .8 A summarized list of all building components requiring ongoing scheduled maintenance.
- .3 Review information provided in the maintenance instructions and manuals with the Owner's operating personnel to ensure a complete understanding of the electrical equipment and systems and their operation.

5.5 Warranty

- .1 When the project is completed, a documentation file is to be given to the City of Saint John. The file should contain all warranty information.
- .2 From the date of issuance of a 'Certificate of Substantial Performance', all equipment, materials and workmanship must be unconditionally warranted for a period of one (1) year, or such longer periods as may be provided in the warranty of the manufacturer of individual components, whichever is longer.
- .3 Defects and deficiencies which originate or become evident during the warranty period must be repaired or replaced, at no additional cost. All work relating to said deficiencies must be carried out at a time, during or after normal working hours, which is acceptable to the occupant.

END OF SECTION

PART 1 GENERAL

1.1 Description of Work

- .1 In general, work of this Section consists of the removal of existing electrical equipment and materials in the existing building. Outlet boxes for receptacles and switches that are no longer required are to be filled and covered with new wall finish. Unless specifically noted within the contract documents, all panels, feeders, and service equipment in the existing building are to remain.

1.2 Related Work

- .1 Waste Management and Disposal: 01 74 19.
- .2 Common Work Results for Electrical: Section 26 05 00.
- .3 Architectural Removals.

1.3 Reference Standards

- .1 All removal or modification work of electrical construction to be done in accordance with the safety standards outlined in the Canadian Electrical Code.

1.4 Protection

- .1 Be responsible for any damages to existing structure as a result of the work.

1.5 Site Survey

- .1 Prior to Tender submission, visit the site and survey and quantify the extent of the removals/alterations required for this contract and include for all costs in the total tendered price. **Extra cost allowances will not be allowed due to existing site conditions.** Site conditions information indicated on the drawings is for general guidance only and does not include all the required work.

1.6 Salvage Material

- .1 Materials and equipment identified on the drawing as being reused are to be taken down, stored, reinstalled, etc. as required to allow for new construction.
- .2 Contractor must identify any damaged equipment or materials intended for reuse prior to demolition and point out deficiencies to the Engineer/Architect at that time.

1.7 Disposal

- .1 Prior to demolition, Owner will identify any items of electrical equipment which are to be set aside as directed for future use by Owner. The Contractor shall provide a list of equipment being removed for Owner's review.
- .2 All other materials and equipment removed under work of this Section becomes the property of the Contractor for disposal off of the property.
- .3 All electrical equipment determined to be environmentally hazardous shall be disposed of in accordance with N.B. Department of Environment instructions and guidelines. These guidelines must be stringently adhered to. Contractors must obtain and familiarize themselves with the Departments disposal methods.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 EXECUTION

3.1 Cutting

.1 Cutting required for removals and alterations to be to the approval of the Engineer/ Architect and performed by General Contractor with appropriate power tools.

3.2 Removal of Ballasts Containing PCBs

- .1 Fluorescent lighting ballasts containing PCBs shall be disposed of in accordance with the NB Department of Environment instructions and guidelines, Environment Canada instructions and guidelines. Identification of lamp ballasts containing PCBs is to be done based on Environment Canada report provided (attached).
- .2 Contractor shall place non-leaking ballasts containing PCBs in Contractor supplied metal leak-proof drums. Drums will be provided, and removed from site, by the Contractor. A list of companies that provide disposal services is attached. A maximum of 130 ballasts are allowed in one barrel. Each ballast is to have wires cut off flush with casing and be wrapped in a sturdy plastic bag. Records must be kept of the number of ballasts going into drum. Contractor must provide a record of proper disposal at conclusion of project consisting of but not limited to, reports indicating end of use of equipment, stored PCBs or products, transfer or destruction facilities shipment and destruction as well as allow Engineer/Owner to view barrels during construction.
- .3 The metal drums used to store PCB containing materials are to be identified with a label that reads: "ATTENTION - contains 50mg/kg or more of PCBs/contient 50mg/kg ou plus de BPC" in black lettering on white background in a font size of no less than 36 points. The label is to measure at least 150 x 150mm.
- .4 When leaking ballast containing PCBs are encountered, the Contractor shall implement the following procedure:
- .1 Place vermiculite or similar absorbent material in a recycle barrel (drum) to a depth of 10 cm.
 - .2 Workers handling leaking ballasts and performing the fixture cleaning must wear protective latex gloves.
 - .3 Remove the ballast (s) from the fixture (s) and cut off the attached wires.
 - .4 Place the ballast in a plastic bag, tie the bag closed and place it in the barrel. Record the actual quantity in each barrel.
 - .5 Ensure adequate ventilation in the work area. Clean any oil or tar residue from the ballast enclosure. Use varsol as a solvent.
 - .6 Rags used for this clean-up, the detached wire pieces and any non-cleanable items must be bagged and placed in a separate recycle barrel (other than the barrel used for the ballasts).
 - .7 Ensure the barrels are placed in a locked room ready for shipping by Contractor at completion of project.
- .5 Light fixture lens and housing shall be cleaned by the Contractor.
- .6 Provide the Owner with list of number of ballasts to be disposed of for reporting to NB Department of Environment and Environment Canada

END OF SECTION

PART 1 GENERAL

1.1 Section Includes

- .1 Materials and installation for wire and box connectors.

1.2 Related Sections

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.3 References

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-C22.2No.18-98 (R2003), Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA C22.2No.65-03(R2008), Wire Connectors. (Tri-National Standard with UL 486A – 486B and NMX-J-543-ANCE-03).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA).

1.4 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect connectors and terminations from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Pressure type wire connectors are to be manufactured to CSA C22.2 No. 65. Clamps and connectors are to be manufactured to CSA C22.2 No. 18. Use twist-on connectors for #14 to #10 wires.
- .2 Building Wire Connectors to be:
 - .1 For wire sizes up to #6 AWG - Ideal 'Wing Nut' or Gardner-Bender 'Wing Gard'.
 - .2 For wire sizes #6 AWG and larger:

- .1 At studs and bus bars – Burndy long barrel compression lugs Cat. # YA-2N c/w inspection window for copper-to-copper connections.
- .2 At studs and bus bars – Burndy long barrel compression lugs Cat. # YAA2 c/w inspection window for copper to aluminum connections.
- .3 Set-screw vibration proof type for motor connections. T&B 2SH or equal.
- .3 Cable connectors to be:
 - .1 For armoured TECK cables, watertight type, with open compounded head - T&B Star Teck Series or equivalent with corrosion resistant boot. Dry-type connectors are not acceptable.
 - .2 For armoured cables steel type with nylon insulated throat - T&B 'Tite-Bite' or equivalent.
- .4 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for conductors.
 - .2 Clamp for copper conductors.
 - .3 Clamp for ACSR conductors.
 - .4 Stud clamp bolts.
 - .5 Bolts for copper conductors.
 - .6 Sized for conductors as indicated.

PART 3 EXECUTION

3.1 Installation

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No. 65.
 - .3 Install vibration proof connectors and tighten. Replace insulating cap.
 - .4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

- .1 Section 26 05 00 – Common Work Results for Electrical.
- .2 Section 26 05 20 - Wire and Box Connectors.
- .3 Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

1.2 References

- .1 CSA C22.2 No .0.3-96, Test Methods for Electrical Wires and Cables.
- .2 CAN/CSA-C22.2 No. 131-M89(R1994), Type TECK 90 Cable.

1.3 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.
- .2 Wire pulling lubricant:
 - .1 Lubricant to be non-corrosive and CSA approved for the type of cable used.

1.4 Delivery, Storage and Handling

- .1 Packaging Waste Management: remove for reuse and return of pallets, crates and packaging materials in accordance with Section 01 74 19 – Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Wire in Conduit:
 - .1 Conductor material to be annealed commercial grade, copper, 98 percent conductivity, up to #10 AWG solid, with RW90 insulation, #10 and larger, stranded, with RW90 insulation, unless noted otherwise, 600V rating. Minimum size #12 AWG (solid) for power and lighting loads, size #14 AWG for control.
 - .2 Colour Coding:
 - .1 Three conductor, 3-phase: 1 red, 1 black, 1 blue
 - .2 Four conductor, 3-phase: 1 red, 1 black, 1 blue, 1 white
 - .3 Ground wires: green
 - .3 Feeders fed from an overcurrent device rated up to and including 100A are to utilize copper conductors. Feeders fed from an overcurrent device rated above 100A may utilize either copper or aluminum conductor material (ACM). Conduit size to be adjusted to suit conductor size per C.E.C.
 - .4 All receptacle circuits within the building are to be fully rated. To avoid voltage drop and derating of circuits, the following maximum circuit lengths are to be followed in sizing cabling (120V circuits):

	#12	#10	#8	#6
15A	25.3m	40.2m	63.8m	101.7m
20A	19.4m	30.8m	49m	77.9m

- .2 TECK Cable:
 - .1 Conductors:
 - .1 Grounding conductor: copper
 - .2 Circuit conductors: copper size as indicated.
 - .2 Insulation:
 - .1 Chemically cross-linked thermosetting polyethylene rated type RW90 1000V.
 - .3 Inner jacket: polyvinyl chloride material.
 - .4 Armour: flat interlocking aluminum.
 - .5 Overall covering: thermoplastic polyvinyl chloride material, FT4 rated.
 - .6 Fastenings:
 - .1 One-hole steel straps to secure surface cables 50mm diameter and smaller. Two-hole steel straps for cables larger than 50mm diameter.
 - .2 Channel type supports for two or more cables at 600mm centres.
 - .3 Steel threaded rods: 6mm diameter to support suspended channels.
 - .7 Connectors:
 - .1 Watertight, approved TECK connectors. T&B Star Teck or approved equal.
- .3 Armoured Cables:
 - .1 Type to be AC-90, Multi-conductor, with solid, annealed commercial grade 98 percent conductivity tinned copper conductors and cross-linked polyethylene with R90 insulation, 600 volt rating, minimum size #12 AWG unless indicated otherwise.
 - .2 Colour Coding:
 - Two conductor, 1 phase: 1 black, 1 white
 - Three conductor, 1 phase: 1 black, 1 red, 1 white
 - .3 Grounding to be uninsulated, solid copper, with impregnated paper separator.
- .4 Control cables:
 - .1 Type LVT: number of soft annealed copper conductors and sized as indicated, minimum with thermoplastic insulation, FT-4 rated outer covering of thermoplastic jacket, and armour of closely wound aluminum wire. Alternately, jacket to meet ULC, NBC and CSA requirements for installation in an air plenum and may be FT-6 rated.

2.2 Bonding & Grounding Conductors

- .1 Bonding and grounding conductors shall be copper with a green insulation covering.
- .2 All feeders and branch circuit conductors installed in conduits shall include a separate green bond wire, sized in accordance with the C.E.C., minimum size #14 (solid) AWG as follows:
 - .1 Where bond wire sizes larger than #14 AWG are required, they are to be increased as required by Table 16 of the C.E.C., or as otherwise noted.
 - .2 Minimum size #14 AWG (solid) green insulated conductors are acceptable for bonding purposes associated with various control systems rated at 50 volts or less.
 - .3 Bonding and grounding conductors up to and including #10 AWG shall have RW90 X-link insulation. For sizes of #8 AWG and larger, TW75 green insulation is acceptable.

2.3 Acceptable Materials

- .1 Philips
- .2 Canada Wire
- .3 Pirelli
- .4 Alcan
- .5 Northern Cables Incorporated

PART 3 EXECUTION

3.1 Installation

.1 General:

- .1 Wire to be installed in conduit and sized for the connected load(s) and protection as required for all branch circuits in corridors, into rooms and in all open ceiling spaces and rooms, unless otherwise specified.
- .2 Wiring methods related to the installation of main feeders: unless specifically indicated otherwise, feeder conductors are to always be installed in conduit.
- .3 Low voltage armoured feeder cables to be installed individually on channels or grouped on cabletrough.
- .4 The current carrying capacity of the feeders, subfeeders and branch circuit conductors to be sized to equal or better than shown on the drawings. If wire or cable sizes with equivalent current carrying capacity other than that specified is used, ensure that the voltage drop is less than 2%.
- .5 The number of wires indicated for various systems is intended to show the general scheme only. The required number and type of wires to be installed in accordance with the manufacturer's diagrams.
- .6 In rooms with dropped T-bar or accessible ceilings, main EMT branch circuits may be converted one meter inside room to AC90 for all branch circuits and drops to devices, fixtures, etc. All wire shall be #12 minimum from panel to individual rooms; however, drops to individual light fixtures may be #14. All cables to be properly secured.
- .7 All communications wiring, cables, etc. to be run in EMT, J-hooks or cable tray in accordance with Section 26 05 29. Telephone and data cabling are each to be tied separately. Sleeve all cable runs through walls and ceilings. All cables to be identified every 15 meters and be fastened every 1.5 meters.
- .8 All cables and wiring should be installed on the warm side of the vapour barrier where possible with vapour barrier penetrations kept to a minimum.

.2 Wire in Conduit:

- .1 Provide pigtails at all outlets for fixtures and wiring devices. All neutrals and branch circuits to be connected in each outlet box to avoid a break in the neutral or the circuit wire when fixture or wiring device is disconnected.
- .2 At each junction, pull and outlet box make a 360 deg. loop of the stripped uncut ground conductor under the ground screws.

.3 TECK Cable:

- .1 Do not directly bury in or below concrete slabs or walls.
- .2 Do not encircle single conductor cable with ferrous metal.
- .3 No splices will be permitted.
- .4 Single conductors of a three or four wire circuit to be run with uniform spacing of not less than one cable diameter throughout the feeder length.
- .5 Use wood throated cable clamps to ensure proper and uniform cable spacing.
- .6 Cable connections to all enclosures, boxes and panels by means of a watertight malleable aluminum connector.

.4 Armoured Cables:

- .1 These cables must be run concealed and may be used only for the following purposes:
 - .1 Final connection from a conduit ceiling box to outlets and receptacles in partitions only.
 - .2 Final connections to luminaires for maximum length of 1.5 m. Loops between fixtures are not permitted - only from junction box to fixture.
- .2 Use insulated throat connectors and anti-short sleeves at all dressed ends.
- .3 All types of 'armoured' cables are to be installed concealed, parallel and perpendicular to building lines and shall be adequately secured to the building structure at not less than 1500mm intervals or as otherwise indicated, protecting cables from mechanical damage.

- .4 Install independent supports for cabling in ceiling spaces, and do not use those of other trades. Cables not to be secured to mechanical systems piping, ducts or suspended ceiling support wires.
- .5 The laying of 'unsupported' cables directly on top of ceiling grid system is prohibited.
- .6 AC90 is not permitted in concrete walls.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 Reference Standards

- .1 All grounding and bonding requirements shall be in accordance with the Canadian Electrical Code, Part 1.

1.3 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect connectors and terminations from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for re-use and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Grounding equipment to be manufactured and installed to CSA C22.2 No. 41.

2.2 Equipment

- .1 Long barrel compression type connectors for grounding of conductor, size as required.
- .2 System and circuit equipment grounding conductors, to be bare stranded copper, non-tinned soft annealed, un-armoured, size as noted on drawings.
- .3 Insulated grounding conductors to be green, type RW90.
- .4 Non-corroding accessories necessary for grounding system, to be of a type, size and material as required, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 "Thermit" welded type conductor connectors.
 - .5 Bonding jumpers, straps.

- .6 Pressure wire connectors.

2.3 Manufacturers

- .1 Acceptable manufacturers or approved equal:
 - .1 Burndy Corp.
 - .2 Erico Inc. Cadweld Division

PART 3 EXECUTION

3.1 Installation

- .1 Install a complete, permanent, continuous circuit and equipment grounding system, including electrodes, conductors, connectors, accessories, and as indicated, to conform to the requirements of the local Electrical Supply Authority and connect to the Building System at the nearest location.
- .2 Ground electrical equipment and wiring in accordance with Canadian Electrical Safety Code and ANSI/IEEE Standard 142 – latest edition.
- .3 Provide a separate green insulated ground conductor in every conduit, in every system, to all devices and fixtures.
- .4 Install connectors in accordance with manufacturer's instructions.
- .5 Protect exposed grounding conductors from mechanical injury.
- .6 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process (or similar exothermic welding).
- .7 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .8 Soldered joints are not permitted.
- .9 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment, between transformers, switchboards, and dimming racks, for elimination of noise transference.
- .10 Make grounding connections in radial configuration only, with connections terminating at single grounding point or street side of metallic water pipe. Ensure that there are no loop connections.
- .11 Bond single conductor, metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end.
- .12 Grounding in all wet areas will be in compliance with Section 68 of the Canadian Electrical Code.

3.2 System and Circuit Grounding

- .1 Install system and circuit grounding connections of primary 600V system, and secondary 208 V system.
- .2 Ground each transformer neutral to the closest ground bus with green insulated copper ground wire, installed in conduit.

3.3 Communication System

- .1 Bond each section of cable tray and all communication conduits.

3.4 Equipment Grounding

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following:
 - .1 Transformers, duct systems, frames and motors, starters, control panels, building steel and metal cladding work.

3.5 Miscellaneous Systems

- .1 Install separate, complete grounding equipment for all security, fire alarm, tele/data and auxiliary systems as required.

3.6 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 00.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Engineer-Architect and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics; performance criteria, physical size, finish and limitations.

1.3 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect connectors and terminations from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Support Channels

- .1 Unless otherwise noted, U shape pre-galvanized steel, size 41 mm x 41 mm x 2.2 mm thick, for surface mounting, suspending, or inserting into poured concrete walls and ceilings as required.
- .2 All channel fittings to suit channel type.
- .3 All other fittings to suit equipment weight, location and surfaces as required.
- .4 Threaded rod and hardware to be galvanized or zinc plated for corrosion prevention.

PART 3 EXECUTION

3.1 Installation

- .1 Secure channels, luminaires, equipment and fittings to wood with wood screws to solid masonry, tile and plaster surfaces with lead anchors, to poured concrete with self-drilling expandable inserts, and to hollow masonry walls with toggle bolts.
- .2 Support ceiling mounted equipment from the ceiling support system.
 - .1 Ensure that the support system is adequate to carry weight of equipment specified before installation, or independently support from structure.
 - .2 Provide the Engineer-Architect and Local Electrical Inspection Department with a letter of approval from Division 09 contractor.
- .3 Support equipment, conduit or cable using clips, spring loaded bolts, or cable clamps designed as accessories to basic channel members.
- .4 Fasten exposed conduit or cables to building using:
 - .1 One-hole steel straps to secure surface conduits and cables 53 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 53 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
- .5 For suspended support system:
 - .1 Support individual cable or conduit runs with 6mm diameter threaded rods and spring clips.
 - .2 Support two or more cables or conduits on channels support by 6mm diameter threaded rod hangers where direct fastening to building construction is impractical.
- .6 For surface mounting of two or more conduits, use channels at 1500mm spacing.
- .7 Provide metal brackets, frames, hangers, clamps and related type of support structure where indicated or as required to support conduit and cable runs.
- .8 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .9 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .10 Do not use supports or equipment installed for other trades for conduit or cable support except with permission and approval of Engineer-Architect.
- .11 Install fastenings and supports as required for each type of equipment, cable and conduits, and in accordance with manufacturer's installation recommendations.
- .12 Trim and file ends of threaded rods to be flush with support channel.

END OF SECTION

PART 1 GENERAL

1.1 Reference Standards

- .1 CSA C22-1, Canadian Electrical Code, Part 1, Latest Edition.

1.2 Delivery, storage and handling

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Junction and Pull Boxes

- .1 Suitable for surface mounting and be of welded steel construction with screw-on flat covers.
- .2 For flush-mounted pull and junction boxes, provide covers with a 25mm minimum extension all around.
- .3 P.V.C. junction and pull boxes to be of a one-piece moulded type.

PART 3 EXECUTION

3.1 Splitter Installation

- .1 Install splitter troughs where required. Mount plumb, true and square to the building lines.
- .2 Extend splitters for full length of equipment arrangement except where indicated otherwise.

3.2 Junction, Pull Boxes and Cabinet Installation

- .1 Install junction and pull boxes in inconspicuous but accessible locations. Location must be coordinated with other trades.
- .2 Only certain junction and pull boxes are indicated. Provide pull boxes so as not to exceed 30 m of conduit run between boxes, and after every 2 (two) 90 deg. bends.
- .3 Mount cabinets with top not higher than 2.0m above finished floor.
- .4 Install pull boxes in locations indicated. Location must be coordinated with Rogers Communications and other underground services.

3.3 Identification

- .1 Install nameplates or label in accordance with Section 26 05 00.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 References

- .1 CSA C22.1 (Latest Edition), Canadian Electrical Code, Part 1.

1.3 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

1.4 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit samples for floor box in accordance with Section 01 33 00 – Submittal Procedures.

1.5 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect connectors and terminations from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Outlet and Conduit Boxes - General

- .1 The construction of outlet boxes, conduit boxes and fittings are to be based on CSA C22.2 No. 18.
- .2 Size boxes in accordance with CSA C22.1.
- .3 Boxes to be suitable for the utilization voltage.
- .4 100mm square or larger outlet boxes as required for special devices.

- .5 Combination boxes to have barriers where outlets for more than one system are grouped.
- .6 Blank cover plates for boxes without wiring devices.
- .7 Recessed 100 mm square or larger outlet boxes to be complete with single or ganged tile rings to suit application.
- .8 Gang boxes where wiring devices are grouped.

2.2 Sheet Steel Outlet Boxes

- .1 Electro-galvanized steel single and multi-gang device boxes for flush installation, to be minimum size 75 mm x 50 mm x 37 mm unless otherwise specified or required. 100 mm square outlet boxes to be used when more than one conduit enters one side, with extension and tile rings as required.
- .2 Boxes for door switches and push buttons to be sized as required.
- .3 Utility boxes for connection to surface mounted EMT conduit, to be minimum 100 x 54 x 48 mm size.
- .4 Square or octagonal outlet boxes for lighting fixture outlets, to be minimum 100 mm size.
- .5 Square outlet boxes with extension and tile rings for flush mounting devices in finished gypsum board or tile walls, to be minimum 100mm size.

2.3 Masonry Boxes

- .1 Electro-galvanized steel masonry single and multi-gang MBD boxes to be used for flush mounted devices in exposed block walls.

2.4 Concrete Boxes

- .1 Electro-galvanized sheet steel concrete boxes to be used for flush mounting in concrete, with matching extension and tile rings as required.

2.5 Conduit Boxes

- .1 Cast FS or FD ferrous alloy boxes with factory-threaded hubs and mounting feet to be used for outlets connected to surface mounted rigid, EMT and PVC conduits.
- .2 Die cast aluminum boxes (single-gang and two-gang) with factory-threaded hubs and mounting feet to be used for all surface mounted devices. Boxes will have powder coat finish (gray).
 - .1 Acceptable materials:
 - .1 Hubbell: RACO No. 5324 series (single gang) and 5341 series (two gang).

2.6 Fittings - General

- .1 Bushing and connectors to be with nylon insulated throats.
- .2 Provide knock-out fillers to prevent entry of foreign materials.
- .3 Use conduit outlet bodies for conduit up to and including 35mm and pull boxes for larger conduits.
- .4 Provide double locknuts and insulated bushings on sheet metal boxes.

PART 3 EXECUTION

3.1 Installation

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, foam sponges or similar approved material to prevent entry of construction material. Remove upon completion of work.
- .3 Size box wiring chambers in accordance with Canadian Electrical Code.
- .4 Gang boxes together where wiring devices are grouped.
- .5 Provide matching blank cover plates for boxes without wiring devices.
- .6 Use combination boxes where outlets for more than one system or voltage are grouped.
- .7 For flush installations, mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .8 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
- .9 Provide "FS" or "FD" feraloy boxes for all surface mounted devices, including fire alarm, security and auxiliary systems.
- .10 Install power and communications boxes on a common stud bracket when shown together on the drawings. Maintain a consistent center to center spacing of 150mm between boxes.
- .11 Boxes that are fastened directly to wall studs are to have integral support on the opposite side of the box to prevent movement once enclosed.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 References

- .1 CSA Group (CSA)
 - .1 CAN/CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware. A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3-05, Non-metallic Mechanical Protection Tubing (NMPT), a National Standard of Canada (February 2006).

1.3 Waste Management and disposal

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

1.4 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

1.5 Location of Conduit

- .1 Drawings do not show all conduits. Those shown are in diagrammatic form only.
- .2 All interior wiring generally shall be in EMT (except where prohibited by Code), including panel feeders, branch circuit power and lighting circuits, fire alarm, security and sound systems, communications and control wiring (as detailed within specifications and on drawings). All conduits and EMT shall be concealed except in electrical or mechanical rooms. Surface mounted and exposed conduits shall be run parallel and perpendicular to building lines.

1.6 Conduit Penetrations

- .1 All conduit penetrations and empty conduit shall be sealed and soundproofed.

PART 2 PRODUCTS

2.1 Conduits

- .1 Electrical metallic tube (EMT) conduit and couplings to be manufactured to C.S.A. C22.2, No. 83.
- .2 Flexible metal conduit and liquid-tight flexible metal conduit to be manufactured to C.S.A. C22.2, No. 56.

2.2 Conduit Fastenings

- .1 Conduit straps to be steel, single or double hole for rigid or EMT conduit.

- .2 Provide one-hole steel straps to secure surface conduits 53mm and smaller, and two-hole steel straps for conduits larger than 53mm.
- .3 Channel type supports for two or more conduits at 1.5m on center.
- .4 Use threaded rods, 6mm diameter, to support suspended channels.
- .5 Beam clamps to secure conduits to exposed steel work.

2.3 Conduit Fittings

- .1 Fittings for conduits to be manufactured to C.S.A. C22.2, No. 18.
- .2 Fittings for rigid conduit to be steel threaded type.
- .3 Fittings for EMT conduit to be steel set screw type.
- .4 All fittings installed below sprinkler heads to be compression/rain tight.
- .5 Fittings for PVC conduit to be rigid, extruded, solvent type, to match Carlon Plus 80 conduits.
- .6 Fittings for flexible conduit and exposed conduit outdoors to be liquid-tight type, straight or angled threaded for rigid and compression for EMT conduit.
- .7 Expansion fittings for rigid, EMT or PVC conduits to be of the watertight type, with an integral bonding assembly, suitable for deflection in all directions.
- .8 Bushings and connectors to be c/w insulated throat.
- .9 Factory "ELLS" where 90° bends are required for 35mm and larger conduits.

2.4 Pulling Cables

- .1 Pulling cables to be polypropylene and of a strength suitable for tension to be pulled.

2.5 Waterproof Membrane

- .1 Conduits penetrating waterproof membranes, to be PEM #6372.

PART 3 EXECUTION

3.1 Installation - General

- .1 All installations on underside of deck must be mounted on structure and not fastened by clamps to underside of deck as required by Local Inspection Authority.
- .2 All conduits to be surface mounted (exposed) in mechanical and electrical service spaces and rooms and concealed elsewhere.
- .3 Provide rain tight connectors with sealing rings when entering or exiting from top or sides of electrical equipment.
- .4 Exposed conduits to be installed to conserve headroom and cause minimum interference in spaces through which they pass.

- .5 Use rigid galvanized steel threaded conduit for all service work unless specified otherwise.
- .6 Use flexible metal conduit c/w anti-short insulators for short connections to transformers in dry areas and connection to surface or recessed fluorescent fixtures, alternately use armoured cables.
- .7 Use electrical metallic tubing (EMT) for branch circuit work except in poured concrete or underground unless indicated otherwise. Install a separate integral ground wire sized in accordance with the C.E.C.
- .8 Install conduit sealing fittings in hazardous areas, and fill conduit with compound.
- .9 Bend conduit without heating. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .10 Mechanically bend conduit over 27mm diameter.
- .11 Field threads on rigid conduit must be of sufficient length to draw conduits tight.
- .12 Install pulling cables in all conduits that are to remain "empty".
- .13 Where conduits become blocked, remove and replace blocked section.
- .14 A maximum of 4 (four), 90 deg. bends, or equivalent up to 360 deg., will be permitted without installation of a pull box. Radius of bends must be no less than 10 (ten) times the conduit diameter.
- .15 Conduits must be dry, before installing wires.
- .16 Install communication conduits with the minimum separations from the following EMI sources:
Exposed power cables <2KV 125mm
Cables in conduit <2KV 62mm
Luminaire ballasts 300mm
Transformers and motors 1000mm
- .17 Do not install conduits above roof deck to avoid penetrations which encourage corrosion.
- .18 Conduit sizing, where indicated, is based on copper conductors and EMT conduit.
- .19 Where metal type Q-Deck is being used, all cables/conduits are to be installed a minimum of 38mm from roof deck. Under no circumstances are cables/conduits to be laid in, fished in, or otherwise installed in top or upper (roof) sides of metal flutes.
- .20 For efficiency and accuracy, color code conduits during installation.

3.2 Surface Conduits

- .1 Surface conduits to be run parallel and perpendicular to building lines.
- .2 Conduits adjacent to structural steel, beams or columns to be run within the flanged portion, unless otherwise shown.
- .3 Group exposed conduits on surface or suspended channels.
- .4 Do not pass conduits through structural members except where indicated.
- .5 Do not locate conduits less than 75 mm parallel to steam or hot water lines. Provide a minimum clearance of 25 mm at crossovers.

3.3 Concealed Conduits

- .1 Do not install horizontal runs in masonry walls.
- .2 Do not install conduits in terrazzo or concrete toppings.

3.4 Conduits in Cast-in-Place Concrete

- .1 Locate to suit reinforcing steel. Install in center one-third of slab.
- .2 Protect conduits from damage where they stub out of concrete.
- .3 Install sleeves where conduits pass through slab or wall.
- .4 Where conduits pass through waterproof membrane, provide oversized sleeve before membrane is installed. Use cold mastic between sleeve and conduit.
- .5 Encase conduits completely in concrete.

3.5 Conduit Size

- .1 The minimum conduit size to be 21mm.

3.6 Communication Conduit

- .1 Where there are more than 2-90° bends, provide a pull box in straight sections so that there are two bends or less in any one section.
- .2 Where a conduit run requires a reverse bend (between 100 degrees and 180 degrees) insert a pull box at each bend having an angle from 100 degrees to 180 degrees.
- .3 A minimum of one (1) pull box to be installed for every 30m of conduit. Each 90° bend equals to a 10 m length of conduit.
- .4 The Contractor to inform the Engineer-Architect of any communication conduit lengths greater than 90m prior to installation.
- .5 Ream all conduit ends and install insulated connectors on each end.
- .6 Terminate all conduits that protrude through the structural floor 50mm above the concrete base.
- .7 Do not use a pull box in lieu of a bend. Align conduits that enter a pull box from opposite ends with each other.
- .8 Minimum space requirements in pull boxes having one conduit each in opposite ends of the pull box to be as noted in the table below:

Maximum Trade Size of Conduit	Size of Pull Box			For Each Additional Conduit Increase Width
	Width	Length	Depth	
21mm	100mm	300mm	75mm	50mm
27mm	100mm	400mm	75mm	50mm
35mm	100mm	400mm	75mm	75mm
41mm	150mm	500mm	100mm	100mm
53mm	150mm	500mm	100mm	125mm

63mm	150mm	500mm	125mm	150mm
78mm	200mm	900mm	125mm	150mm
91mm	200mm	900mm	150mm	150mm
103mm	250mm	1220mm	200mm	200mm

END OF SECTION

PART 1 GENERAL

1.1 Section Includes

- .1 Switches, dimmers, occupancy sensors, power packs, relay panels, cover plates and their installation.

1.2 Related Sections

- .1 Section 01 74 19 - Waste Management and Disposal.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.3 References

- .1 Read and be governed by Section 26 05 00.
- .2 Canadian Standards Association (CSA International):
 - .1 CSA-C22.2 No.42.1-00, Cover Plates for Flush-Mounted Wiring Devices (Binational standard, with UL 514D).
 - .2 CSA-C22.2 No.55-M1986(July 2001), Special Use Switches.

1.4 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics; performance criteria, physical size, finish and limitations.

1.5 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect connectors and terminations from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

- .2 Cover plates to match Section 26 27 26 – Wiring Devices.

PART 2 PRODUCTS

2.1 Standards

- .1 Construction of manually operated general purpose AC switches is to be based on CSA.2 No. 111 and snap switches on CSA C22.2 No. 55.
- .2 Devices to be Specification Grade and of one manufacturer throughout unless otherwise noted.

2.2 Switches – Line Voltage

- .1 Switches to be 15A, 120 volt, silent, AC type, CSA listed, single pole, double pole, threeway or four way as indicated, with the following features:
 - .1 Terminal holes approved for No. 10 AWG wire, silver alloy contacts, and urea or melamine mouldings for parts subject to carbon tracking.
 - .2 Suitable for back and side wiring, and rated for tungsten filament and LED lamps, and up to 80% of rated capacity of motor loads.
- .2 White decora style switches to be used.
- .3 Acceptable manufacturer:
 - .1 Hubbell #DS115W (decora)
 - .2 Leviton
 - .3 P&S
 - .4 Eaton

2.3 Wall Occupancy Sensor – Line Voltage

- .1 Dual technology passive infrared and ultrasonic technology to detect occupancy. Lighting manually turned 'ON'. After a user-specified length of time when no occupancy is detected, lighting automatically switched 'OFF'.
- .2 120V.
- .3 Coverage of 180 degrees.
- .4 Time delay adjustable from 30 seconds up to 30 minutes.
- .5 Adjustable unit sensitivity from 20% to 100%.
- .6 Adjustable light level setting of 2 – 200fc.
- .7 White.
- .8 Acceptable manufacturer:
 - .1 Sensor Switch #WSX-PDT-SA-WH
 - .2 Philips
 - .3 Eaton

PART 3 EXECUTION

3.1 Installation

- .1 Switches:
 - .1 Install single throw switches with lever in 'UP' position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.

- .2 Coverplates:
 - .1 Protect coverplate finish until painting and other work is finished or install after painting is complete.
 - .2 Install suitable matching common (ganged) coverplates where wiring devices are grouped.
 - .3 Do not use flush type coverplates on surface mounted boxes.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 Reference Standards

- .1 CSA Group (CSA)
 - .1 CSA C9-02 (R2007), Dry-Type Transformers.
 - .2 CAN/CSA – C802.2-06, Minimum Efficiency Values for Dry Type Transformers.

1.3 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data/Shop Drawings:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics; performance criteria, physical size, finish and limitations.

1.4 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 – Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for wiring devices for incorporation into manual.

1.5 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect connectors and terminations from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

PART 2 PRODUCTS

2.1 Transformers

- .1 Dry type transformers to be manufactured to CSA C22.2 No. 47, CSA C9 and CAN/CSA-C802. All dry-type transformers rated 30kVA or lower shall meet the requirements of the latest edition of CSA Standard C802 – Maximum Losses for Distribution Power, and Dry-Type Transformers. All dry-type transformers rated 45kVA and over all be high efficiency harmonic mitigating type.
- .2 Use transformers of one manufacturer throughout project.
- .3 Design:
 - .1 Type: ANN
 - .2 150 deg. C temperature rise insulation system.
 - .3 Basic Impulse Level (BIL): standard.
 - .4 Hipot: standard.
 - .5 Average sound level: 55 db (151-300 KVA)
 - .6 Impedance at 170 deg.C: 3 to 6%
 - .7 Enclosure: EEMAC 1 modified to sprinklerproof construction, removable metal front panel.
 - .8 Mounting: floor, wall or suspended as indicated.
 - .9 Windings: copper electrostatically shielded, losses not to exceed CSA C802.2-00 Standards.
 - .10 To be wired delta/wye, unless otherwise specified.
 - .11 4 (four) 2-1/2% taps, 2 FCAN and 2FCBN.
 - .12 Provisions for incoming and outgoing conductor entry shown on drawings.
 - .13 Ground provisions specified in Table 4 of CSA standard.
 - .14 Full load voltage regulation not more than 3 to 5% at 80% power factor.
 - .15 Vibration isolators.
 - .16 Finish in accordance with 26 05 00.
 - .17 3-Phase, 600V input, 480V/277 output, 60Hz, kVA as per drawings.

2.2 Equipment Identification

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Label size: 7.

2.3 Acceptable Materials

- .1 Schneider
- .2 Hammond
- .3 BEMAG
- .4 STI Power
- .5 The Delta Group
- .6 REX
- .7 Marcus

PART 3 EXECUTION

3.1 Mounting

- .1 Unless otherwise shown:
 - .1 Mount transformers up to 75 KVA on wall or suspended from slab above, unless otherwise shown.
 - .2 Mount transformers 75 KVA and above, on the floor, unless otherwise shown. Transformers must be bolted securely to concrete housekeeping pads.
- .2 Ensure adequate clearance around transformer for ventilation.
- .3 Install transformers in level upright position.
- .4 Loosen or remove shipping supports only after transformer is installed and just before putting into service.
- .5 Rubber vibration isolating pads are to be placed between transformer support channels at each of four corners, in locations where transformer has been secured to concrete housekeeping pad. Loosen isolation pad bolts until no compression is visible. Follow manufacturer's recommendations for transformer with built-in isolating pads.
- .6 Make primary and secondary connections with flexible metal conduits.
- .7 Energize transformers as soon as possible after installation is completed, when practicable.
- .8 Adjust transformer taps as required to achieve suitable secondary voltage at loads.
- .9 All floor mounted transformers to be installed on a 100mm high concrete base.
- .10 Vacuum and clean transformers before energizing.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 Reference Standards

- .1 CSA Group (CSA)
 - .1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CAN/CSA C22.2 No.42.1-00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).

1.3 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data/Shop Drawings:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wiring devices and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for wiring devices for incorporation into manual.

1.5 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wiring devices from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

PART 2 PRODUCTS

2.1 Standards

- .1 Construction of manually operated general purpose AC switches is to be based on CSA.2 No. 111, snap switches on CSA C22.2 No. 55, and receptacles, plugs and similar wiring devices on CSA C22.2 No. 42.
- .2 Devices to be Specification Grade and of one manufacturer throughout unless otherwise noted.

2.2 Receptacles

- .1 Duplex receptacles to be CSA Type 5-15 R, 125V, 15A, U ground commercial specification grade with the following features:
 - .1 White and are to be Decora style.
 - .2 Suitable for No. 10 AWG for back and side wiring, have break-off links for use as split receptacles, and 8 (eight) back wired entrances, 4 (four) side wiring screws and double wipe contacts with riveted grounding contacts.
- .2 Other receptacles to have configuration, ampacity and voltage as indicated.
- .3 Receptacles of one manufacturer throughout project.
- .4 Voice devices - Refer to Section 27 15 01.
- .5 Acceptable Materials:
 - .1 Hubbell #DR15WHI
 - .2 Leviton
 - .3 Legrand
 - .4 Cooper
 - .5 Bryant

2.3 Coverplates

- .1 Provide coverplates for single and combination wiring devices, of types, sizes and with gang in and cutouts as indicated. Select plates to match and mate wiring devices to which attached.
- .2 Unless otherwise noted, coverplates shall be stainless steel, 1mm thick, vertically brushed for devices mounted in flush outlet boxes.
- .3 Sheet metal coverplates for wiring devices mounted in surface mounted FS or FD type conduit boxes.
- .4 Electrical Contractor to ensure coordination of all coverplates throughout project, including telephone and data. Numbers required are to be coordinated with telephone and data contractor.

PART 3 EXECUTION

3.1 Installation

- .1 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one device is required in one location.
 - .2 Where split receptacle has one portion switched, mounted vertically and switch upper portion.

-
- .3 Provide circuit identification with “Brady” type labeler (foam backed raised label) with panel name and circuit number from which the receptacle is fed. Lettering to be 6mm high and as follows:
 - .1 Normal power: black lettering on white background.
 - .2 Provide additional label for dedicated circuit receptacles, of matching colour, indicating the words: “Dedicated Circuit.”
 - .4 Securely mount receptacles plumb and parallel to wall surface using sheet metal levelers where needed.
 - .5 Connect receptacle grounding terminal to the outlet box with an insulated green ground wire.
 - .6 Install receptacles in “ground up” or “neutral up” position.
 - .7 Receptacle face to project out past the cover plate.
 - .8 Test receptacles for correct wiring, voltage and circuit. Correct any shorts or issues.
-
- .2 Coverplates:
 - .1 Protect coverplate finish until painting and other work is finished or install after painting is complete.
 - .2 Install suitable matching common (ganged) coverplates where wiring devices are grouped.
 - .3 Do not use flush type coverplates on surface mounted boxes.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 Reference Standards

- .1 CSA Group (CSA)
 - .1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.3 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Include time-current characteristic curves for breakers with ampacity of 400A and over or with interrupting capacity of 22,000A symmetrical (rms) and over at system voltage.

1.4 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store circuit breakers in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect circuit breakers from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Breakers - General

- .1 Moulded case circuit breakers shall be manufactured to CSA C22.2 No. 5.
- .2 Bolt-on moulded case circuit breakers shall be quick make, quick break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .3 Common trip breakers shall be complete with single handle for multiple applications.

- .4 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3 to 8 times current rating.
- .5 Circuit breakers with interchangeable trips as indicated.
- .6 Mini circuit breakers, twin or tandem breakers are not acceptable.
- .7 Moulded case circuit breaker frames to be selected to minimize arc flash.

2.2 Thermal Magnetic Breaker

- .1 Moulded case circuit breakers to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping under overload conditions and instantaneous magnetic tripping for short circuit protection.
- .2 Circuit breakers for frame sizes over 150A, shall be complete with interchangeable trips.

2.3 Solid State Trip Breakers

- .1 Moulded case circuit breakers are to operate by means of a solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, long time, short time and instantaneous tripping, for phase and ground fault short circuit protection.

2.4 Additional Features

- .1 Include, where required:
 - .1 Shunt trip.
 - .2 Auxiliary switch.
 - .3 Motor-operated mechanism c/w time delay unit.
 - .4 On-Off locking device.

2.5 Enclosures

- .1 Enclosures for individual breakers shall be suitable for EEMAC 1 applications and be complete with lever handle operator.

2.6 Manufacturers

- .1 Acceptable manufacturer or approved equal:
 - .1 Siemens (600V, 3-phase breaker must fit in existing Siemens P2 panel)
 - .2 Eaton (120V breakers must fit in existing Westinghouse panel)

PART 3 EXECUTION

3.1 Installation

- .1 Install circuit breakers as indicated.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 Reference Standards

- .1 CSA Group (CSA)
 - .1 CAN/CSA C22.2 No.144-M91(R2006), Ground Fault Circuit Interrupters.
- .2 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA PG 2.2-1999(R2009), Application Guide for Ground Fault Protection Devices for Equipment..

1.3 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data/Shop Drawings:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for ground fault circuit interrupters and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for ground fault circuit interrupters for incorporation into manual.

1.5 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect ground fault circuit interrupters from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

PART 2 PRODUCTS

2.1 Materials

- .1 Ground fault circuit interrupters Class 'A' shall be manufactured to CSA and Electrical Bulletin No. 752.
- .2 Components forming the ground fault protective system, to be of same manufacturer.

2.2 System No. 2 – Protector Unit

- .1 Self-contained ground fault protector unit with 15 A, 120V (or 20A where noted) circuit interrupter and grounded duplex receptacle complete with:
 - .1 Test feature and reset switch.
 - .2 Unit shall trip at 4-6mA, unless otherwise noted.
 - .3 Red or green indicator light.
 - .4 Trip time: 0.025 sec.
 - .5 White with coverplate to match Section 26 27 26.
 - .6 Maximum Interrupting Capacity: 10 kA
 - .7 Acceptable Materials:
 - .1 Hubbell: GF15WLA (15A)
 - .2 Leviton
 - .3 P&S
 - .4 Bryant
 - .5 Cooper

PART 3 EXECUTION

3.1 Installation

- .1 Neutral must not be grounded on load side of ground fault relay.
- .2 Phase conductors and neutral must pass through zero sequence transformers.
- .3 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.
- .4 Test receptacle for correct wiring, voltage, circuit, trip and reset.

3.2 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Demonstrate simulated ground fault tests.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 Reference Standards

- .1 International Electrotechnical Commission (IEC)
 - .1 IEC 947-4-1-2002, Part 4: Electromechanical contactors and motor-starters.

1.3 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Provide shop drawings for each type of starter to indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter size and type.
 - .3 Layout and components.
 - .4 Enclosure types.
 - .5 Wiring diagram.
 - .6 Interconnection diagrams.
 - .7 Project specific equipment designation.

1.4 Closeout Submittals

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit operation and maintenance data for each type and style of motor starter for incorporation into maintenance manual.
- .3 Extra Materials:
 - .1 Provide listed spare parts for each different size and type of starter.
 - .1 3 contacts, stationary.
 - .2 3 contacts, movable.
 - .3 1 contacts, auxiliary.
 - .4 1 control transformer.
 - .5 1 operating coil.
 - .6 2 fuses.
 - .7 10% indicating lamp bulbs used.

1.5 Delivery, Storage and Handling

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

- .3 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 Acceptable Materials

- .1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

PART 2 PRODUCTS

2.1 General

- .1 All starters will be built and tested in accordance with CSA Standards and sized in accordance with "EEMAC" sizes. Minimum starter size to be 1. Half sizes are not acceptable.
- .2 Supply characteristics: 600V, 60 Hz, Delta connected, 3 phase, 3 wire, unless noted otherwise.

2.2 Manual Motor Starters

- .1 Single or three phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 One or three overload heaters, manual reset, trip indicating handle.
- .2 Accessories:
 - .1 Toggle switch: heavy duty labelled as indicated.
 - .2 Red and green indicating light: heavy duty type.
 - .3 Locking tab to permit padlocking in "ON" or "OFF" position.

2.3 Finishes

- .1 Apply finishes to enclosure in accordance with Section 26 05 00 – Common Work Results for Electrical.

2.4 Equipment Identification

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Manual starter designation label, white plate, black letters, size 1, engraved as indicated.
- .3 Indicate equipment name, voltage, phase, and source.

2.5 Acceptable Materials

- .1 Schneider
- .2 Eaton
- .3 Siemens
- .4 Moeller
- .5 Allen-Bradley

PART 3 EXECUTION

3.1 Installation

- .1 Install starters, connect power and control as indicated.
- .2 Ensure correct fuse/breakers and electronic overload devices elements installed.
- .3 Final connections to all motors will be made with liquid tight flex.

3.2 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and manufacturer's instructions.
- .2 Operate switches, contactors to verify correct functioning.
- .3 Perform starting and stopping sequences of contactors and relays.
- .4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

- .1 Section 01 74 19 – Waste Management and Disposal.
- .2 Section 26 05 00 - Common Work Results for Electrical.

1.2 System Description

- .1 Lighting system shall consist of specified light fixtures in the fixture schedule and shall include all associated frames, supports, hangers, spacers, stems, aligner canopies, junction boxes and other hardware for a complete and proper installation.
- .2 Catalog numbers indicated in the fixture schedule are a luminaire design series reference and do not necessarily represent the exact catalog number, size, voltage, wattage, driver, finish trim, ceiling type, mounting hardware or special requirements as specified or as required by the particular installation. Contractor shall provide complete luminaire to correspond with the features, accessories, lumen output, wattage and/or size specified in the text description of each luminaire type. Additional features, accessories and options specified shall be included.
- .3 Recessed luminaires shall have frames that are compatible with the ceiling systems.
- .4 Luminaire voltage shall match the voltage of the circuit serving the same.

1.3 References

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41, latest revision, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- .2 ASTM International Inc.
 - .1 ASTM F1137, latest revision, Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
 - .2 ASTM A123/A123M, latest revision, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A167, latest revision, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
 - .4 ASTM A366/A366M, latest revision, Specification for Steel Sheet, Carbon, Cold-Rolled, Commercial Quality.
- .3 Illuminating Engineering Society of North America (IESNA)
 - 1. IES Lighting Handbook, Reference and Application.
 - 2. IES LM-79, latest revision, Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products
 - 3. IES LM-80, latest revision, Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
 - 4. IES TM-21, latest revision, Projecting Long Term Lumen Maintenance of LED Light Sources
- .4 Canadian Standards Association (CSA International)
- .5 ICES-005, latest revision, Radio Frequency Lighting Devices.
- .6 Underwriters' Laboratories of Canada (ULC)

1. UL 94, latest revision, Test for Flammability of Plastic Materials for Parts in Devices and Appliances.
 2. UL 508, latest revision, Industrial Control Equipment.
 3. UL 8750, latest revision, The Standard for Safety of Light Emitting Diode (LED) Equipment for use in Lighting Product.
- .7 DesignLights Consortium (DLC).

1.4 Actions and Informational Submittals

- .1 Submit shop drawings and product data in accordance with Section 26 05 00 for each type of luminaire, for review by the Engineer. Shop drawings shall include the following:
1. Luminaire designation from the lighting schedule.
 2. Physical description of luminaire including dimensions, finishes and all accessories applicable to the installation under this project.
 3. Description of the driver and associated surge suppression.
 4. Photometric data, certified by a qualified independent testing agency, in IESNA format, based on certified results of laboratory tests for the driver/LED array combination applicable to the installation under this project. (LM-79 test report)
 5. Energy efficiency data. (LM-79 report)
 6. LM-80 test report for the LED array applicable to the installation under this project.
 7. Description of lumen maintenance for the driver/LED array combination applicable to the installation under this project. (in accordance with TM-21)
- .2 Manufacturer's Instructions: submit manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.5 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
- .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area;
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return pallets, crates, padding and packaging materials.
- .5 Divert unused materials from landfill to recycling facility.

1.6 Quality Assurance

- .1 Manufacturer's Warranty: submit manufacturer's standard warranty document and include in the Operation and Maintenance Manual.
- .2 Manufacturer's warranty shall include as a minimum the replacement of all failed components within an LED light fixture, including but not limited to LED arrays and LED drivers for a period of five (5) years from the date of substantial completion.
- .3 The manufacturer's warranty letter shall be furnished by the Electrical Distribution Agency responsible for the lighting system for this project. The letter shall include as a minimum the following:
- .1 Contact information for the Electrical Distribution Agency

- .2 The description of the warranty and the warranty period for the product(s)
- .3 The effective date of the warranty
- .4 A reference number for the particular project for ease of reference

- .4 Designated manufacturers are listed to define the requirements for quality and function of the specified product. The administration of qualified products is being carried out by Department of Transportation and Infrastructure-Buildings Group. Manufacturers currently not listed who wish to be considered for approval shall contact the same.

1.7 Coordination

- .1 Coordinate layout and installation of luminaires with ceiling system and other construction that penetrates ceilings or is supported by them including mechanical systems, fire suppression, and partition assemblies.
- .2 Coordinate luminaire layout in each area with mechanical systems installer to eliminate depth and location conflicts.

PART 2 PRODUCTS

2.1 General

- .1 All LED luminaires shall conform to UL 8750.
- .2 All LED luminaires shall have published supporting LM-79 and LM-80 reports for the driver/LED array combination applicable to the installation under this project.
- .3 All LED luminaires shall be Restriction of Hazardous Substance Directive (RoHS) compliant.
- .4 All LED luminaires shall have published reports confirming the maintenance of the rated lumen output to 70% at 50,000 hours. Measurement of such must be in accordance with TM-21.
- .5 Compatibility: manufacturer shall submit in writing compatible external control components for each luminaire used.
- .6 Luminaire efficacy: in accordance with DLC requirements.
- .7 Light fixture manufacturer shall be a company with a minimum of 5 years of success manufacturing LED light fixtures for the Canadian market. The agency representing the manufacturer shall be an established company that has had and currently maintains a locally run and operated business in New Brunswick for at least five years. A listing of five (5) projects shall be provided (if requested) where the manufacturer's similar products have been used in Canada, including location, contact person and telephone number.

2.2 LED Array

- .1 LED array shall be replaceable.
- .2 LED color temperature shall be 3500K.
- .3 Color maintenance overrated life shall be within 0.007 of CIE 1976.
- .4 CRI shall be ≥ 80 .

2.3 Power Supplies/Drivers

- .1 Input voltage: 120V, 60Hz.
- .2 Power factor: ≥ 0.9 .
- .3 THDi: $\leq 20\%$.
- .4 Power supply shall include surge protection of minimum 3 kV. Surge protection shall meet ANSI C62.41.
- .5 Power supply shall allow light fixture to dim to 10% with the use of external 0-10V dimming control devices.

2.4 Luminaire Schedule

- .1 See Electrical Drawings.

PART 3 EXECUTION

3.1 Installation

- .1 Set level, plumb, and square with ceilings and walls, and secure according to manufacturers written instructions.
- .2 In electrical drawings and specifications, referenced dimensions from walls, ceilings, bulkheads, etc. are for general information only. Exact dimensions shall be measured on site and/or obtained from architectural drawings.
- .3 Verify weight and mounting method of all luminaires prior to ordering and provide suitable supports. Coordinate with General Contractor for luminaires that require additional support, especially where seismic protection is required. Lighting fixtures above 25 pounds to be supported independent of suspended ceilings.
- .4 Refer to architectural reflected ceiling plans for coordination of luminaire locations with mechanical, fire protection, technology and fire safety equipment. Where conflicts occur, coordinate with Engineer-Architect.
- .5 In accessible ceiling spaces, flexible conduit used for luminaire wiring shall not exceed 1500mm of length run from a rigidly supported junction box.
- .6 Adjust aperture flanges or rings of all recessed luminaires in order to remain flush with the finished ceiling. Trim shall completely conceal ceiling opening.
- .7 Luminaires shall not be secured to ductwork or other raceways/systems.
- .8 Adhere to manufacturer's installation guidelines regarding proper thermal management.

3.2 Cleaning and Adjusting

- .1 Remove protective plastic covers from luminaires only after construction work, painting and clean-up are completed. Remove, clean, and reinstall all dirty lamps, reflectors and diffusers.
- .2 Clean luminaires internally and externally after installation. Use methods and materials recommended by manufacturer for cleaning Alzak reflectors and other surfaces.

- .3 Make final adjustment of aimable luminaires and adjustable light settings as required

3.3 Identification

- .1 Install labels with panel and circuit numbers on concealed junction and outlet boxes and at fixtures. Comply with requirements for identification specified in Section 26 05 00.

3.4 Field Quality Control

- .1 Inspect each installed luminaire for damage. Replace luminaires that are damaged or blemished.
- .2 Replace all inoperable components of luminaires and ensure they operate correctly.
- .3 Complete the commissioning, testing and performance verification in accordance with Section 01 91 13.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

- .1 Section 01 74 19 – Waste Management and Disposal.
- .2 Section 26 05 00 - Common Work Results for Electrical.

1.2 References

- .1 Canadian Standards Association (CSA International).

1.3 Action and Informational Submittals

- .1 Submit shop drawings and product data in accordance with Section 26 05 00, for review by the Engineer.
- .2 Manufacturer's instructions: submit manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.4 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and acceptance requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and handling requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Deliver batteries in dry state unless hermetically sealed.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging waste management: remove for reuse and return pallets, crates, padding and packaging materials.
- .5 Divert unused materials from landfill to recycling facility.

1.5 Quality Assurance

- .1 Manufacturer's warranty: submit manufacturer's standard warranty document and include in the Operation and Maintenance Manual.

PART 2 PRODUCTS

2.1 Battery Units

- .1 Emergency lighting equipment: to CSA C22.2, No. 141.
- .2 Supply voltage: 120/347 V ac.
- .3 Output voltage: 12 V dc.
- .4 Operating time: 30 min.

- .5 Battery: sealed, maintenance free.
- .6 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01V for plus or minus 10% input variations.
- .7 Solid state transfer circuit.
- .8 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.
- .9 Signal lights: solid state, for 'AC Power ON' and 'High Charge'.
- .10 Lamp heads: integral on unit and remote, 345 degrees horizontal and 180 degrees vertical adjustment. Cubic style, vandal resistant, high-impact polycarbonate. Lamp type: LED, 5W.
- .11 Cabinet: suitable for direct or shelf mounting to wall and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .12 Finish: white.
- .13 Auxiliary equipment:
 - .1 Ammeter.
 - .2 Voltmeter.
 - .3 Test switch.
 - .4 Time delay relay.
 - .5 Battery disconnect device.
 - .6 AC input and DC output terminal blocks inside cabinet.
 - .7 Self-test diagnostic circuitry. All LED luminaires shall be DLC Standard Version 4.1 Listed.
- .14 Complete with wire guard where indicated.
- .15 Acceptable manufacturer or approved equal: see fixture schedule on electrical drawings for part numbers.

2.2 Remote Units

- .1 Supply voltage: 12 V dc.
- .2 Lamp heads: integral on unit and remote, 345 degrees horizontal and 180 degrees vertical adjustment. Cubic style, vandal resistant, high-impact polycarbonate. Lamp type: LED, 5W.
- .3 Two (2) lamps in single cube or side-by-side twin cube configuration.
- .4 Complete with wire guard where indicated.
- .5 Acceptable manufacturer or approved equal: see fixture schedule on electrical drawings for part numbers.

2.3 Wiring of Remote Units

- .1 Conduit: type EMT, in accordance with Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Conductors: RW90 type in accordance with Section 26 05 21 – Building Wires, sized as indicated. Input voltage: 120V, 60Hz.

PART 3 EXECUTION

3.1 Installation

- .1 Install battery units and remote units as indicated.
- .2 Mount directly to wall at a height specified in Section 26 05 00.
- .3 Connect to lighting circuit of area served.
- .4 Size wiring to manufacturer's requirements to ensure maximum 2% voltage drop on the DC side.

3.2 Cleaning and Adjusting

- .1 Remove protective plastic covers from luminaires only after construction work, painting and clean-up is completed. Remove, clean and re-install all dirty/dusty components.
- .2 Clean luminaires internally and externally after installation. Use method and materials recommended by manufacturer.
- .3 Aim heads to illuminate path of egress in corridors and as indicated in open areas.

3.3 Identification

- .1 Install labels with panel and circuit numbers on concealed junction and outlet boxes at luminaries. Comply with requirements for identification specified in Section 26 05 00.

3.4 Field Quality Control

- .1 Inspect each installed luminaire for damage. Replace luminaires that are damaged or blemished.
- .2 Replace all inoperable components of luminaires and ensure they operate correctly.
- .3 Complete the commissioning, testing and performance verification in accordance with Section 01 91 13.

END OF SECTION

PART 1 GENERAL

1.1 Reference Standards

- .1 Do elevator services work to CSA B44 and CSA B44S3 except where specified otherwise.
- .2 Installation must comply with the Province of New Brunswick Elevator and Lifts Act and requires the Chief Elevator Inspector's "Certificate of Inspection" for final inspection.

1.2 Description of System

- .1 Elevator power and lighting, supply, switching and protection; lighting systems, pits, secondary levels, supplementary controls, conduit and wiring for associated equipment.

PART 2 PRODUCTS

2.1 Materials

- .1 Building Wires: to Section 26 05 21.
- .2 Conduits: to Section 26 05 34.
- .3 Luminaires: to Section 26 50 00.
- .4 Elevator controller with integral fused disconnect switches by Elevator Supplier. Elevator transformer by Electrical Contractor. Direct connection for power and cab power/lighting under this Contract.

PART 3 EXECUTION

3.1 Installation

- .1 Review installation requirements with Elevator Inspector prior to rough-in.
- .2 Install conductors, conduits, make connections as indicated, for:
 - .1 Power
 - .2 Lighting
 - .3 Emergency voice communications
- .3 Interface between work in Divisions 26, 27 & 28 and work in Division 14 at supply terminals of elevator controller. Leave sufficient length of wire to make connections to controller.
- .4 Install conduit system for telephone as indicated.
- .5 Install lights, switches, receptacles for pit, as indicated.
- .6 Do not install any equipment in elevator hoistway, except equipment associated with elevator services.
- .7 All conduit and wiring beyond the main controller to be installed by the elevator installer.

3.2 Field Quality Control

- .1 Demonstrate to Engineer-Architect that services operate and coordinate with elevator as intended.

END OF SECTION

PART 1 GENERAL

1.1 Reference

- .1 Read and be governed by Section 26 05 00 – Common Work Results for Electrical.

1.2 Related Work

- .1 Comply with relevant sections of this and other divisions of this specification.

1.3 Action and Informational Submittals

- .1 Submit shop drawings and product data in accordance with Section 26 05 00, for review by the Engineer.
- .2 Manufacturer's instructions: submit manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.4 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for horizontal distribution cables for incorporation into manual.

1.5 Description

- .1 The horizontal distribution cables to be primarily modularized to consist of the following components:
 - .1 Horizontal voice cables (blue) consisting of individually jacketed unshielded twisted pair cables routed from existing elevator connection box to new elevator controller (shared phone line).

PART 2 MATERIALS

2.1 Horizontal Cables

- .1 Voice Cables:
 - .1 Extend the horizontal voice distribution cable connecting the existing elevator controller dialer to utilize one pair for new elevator emergency telephone. Coordinate phone line with telephone service provider.
 - .2 The horizontal unshielded twisted pair zone cable to be of unshielded twisted pair cordage with eight (8) - 24 AWG solid conductors formed into four individually twisted pairs and enclosed in an FT6 rated blue jacket in accordance with National Building Code requirements. The cable to be a high-performance cable with a minimum of EIA/TIA 568B.2.1 Category 6 performance parameters.

2.2 Acceptable Manufacturers

- .1 Belden
- .2 Panduit
- .3 Leviton

PART 3 EXECUTION

3.1 Installation

.1 General:

- .1 Supply all materials and labour for the installation of the horizontal distribution cable and termination as shown on the accompanying drawings and in this specification.
- .2 Install the horizontal distribution cable in accordance with manufacturer's specifications.
- .3 All cables are to be pulled in a continuous run. No cable splices will be permitted.
- .4 Provide and install additional vertical and horizontal supports (i.e., cabletrays, J-hooks) as necessary in areas requiring vertical or horizontal transitions.
- .5 Route all cables and conduits to maintain minimum separations from sources of lighting, power cables, HVAC and electrical equipment as indicated in the minimum separation schedule. The contractor to be responsible for the supply of all materials (such as cabletrays, J-hooks, harnesses or supports) and labour that may be required to maintain the indicated minimum separations.
- .6 Where required, ground all cable and components according to manufacturers' specifications and standard practices.
- .7 All cable supports and Velcro must be carefully installed so as not to deform the cable jacket or internal cable pair geometry in accordance with Category 6 installation standards.
- .8 The Contractor is to coordinate the installation of the voice cable with other trades as required for the installation of these cables.
- .9 Velcro to be utilized for cable bundling and routing. Standard plastic tie wraps are unacceptable.
- .10 All communications cabling to be neatly COMBED to their point of termination. Standard bundled voice cabling will NOT be accepted.
- .11 The Contractor is to supply and install a protective housing around all sleeves and slots through which the communications cables are routed through. The protective housing must also ensure that cable bend radii are not exceeded.
- .12 Any ceiling routed free-running cables to be securely fastened to appropriate cable supports and J-hooks at a minimum of 1.5m. All cables to be completely supported by the J-hook so that the entire mass of the cables and the J-hook is self supporting and no weight is transferred to any other existing fixture or structure in the ceiling space (such as suspended ceiling or light fixtures). The Contractor to be responsible for the supply of all materials (such as hangers, J-hooks or supports) and labour that may be required to achieve this.
- .13 Provide any sleeving and patching required in the routing of the voice cables.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 Reference Standards

- .1 National Research Council Canada (NRC)
 - .1 National Building Code of Canada 2015 (NBC).
- .2 Treasury Board of Canada (TBS), Occupational Safety and Health (OSH)
 - .1 Fire Protection Standard-10.
- .3 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S525-07, Audible Signal Devices for Fire Alarm Systems, Including Accessories.
 - .3 CAN/ULC-S526-07, Visual Signal Devices for Fire Alarm Systems.
 - .4 CAN/ULC-S527-99, Standard for Control Units for Fire Alarm Systems.
 - .5 CAN/ULC-S528-05, Manual Pull Stations for Fire Alarm Systems.
 - .6 CAN/ULC-S529-09, Smoke Detectors for Fire Alarm Systems.
 - .7 CAN/ULC-S530-91(R1999), Heat Actuated Fire Detectors.
 - .8 CAN/ULC-S536-04, Inspection and Testing of Fire Alarm Systems.
 - .9 CAN/ULC-S537-04, Verification of Fire Alarm Systems..

1.3 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for multiplex fire alarm system and voice communication systems and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate on shop drawings:
 - .1 Detail assembly and internal wiring diagrams for control unit, auxiliary cabinets.
 - .2 Overall system riser wiring diagram identifying control equipment, initiating zones, signaling circuits; identifying terminations, terminal numbers, conductors and raceways.
 - .3 Details for devices.
 - .4 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.
 - .5 Step-by-step operating sequence, cross referenced to logic flow diagram.

1.4 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for fire alarm and voice communication systems for incorporation into manual.
- .3 Include:
 - .1 Instructions for complete fire alarm system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.

- .3 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
- .4 List of recommended spare parts for system.

1.5 Maintenance Material Submittals

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

1.6 Quality Assurance

- .1 Inspection tests to conform to: CAN/ULC-S536.
- .2 Submit inspection report to Departmental Representative and Consultant.

1.7 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of pallets, crates, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.8 Description of System

- .1 The existing fire alarm system operation is to be maintained. Provide all necessary hardware specifically tailored for this installation. Existing system is an Edwards EST3 system.

PART 2 PRODUCTS

2.1 Materials

- .1 All equipment to be CSA approved, ULC listed and manufactured to the following standards:
Smoke detectors: ULC-S529.
- .2 All equipment used for the fire alarm system to be designed and supplied by a single manufacturer, to ensure uniformity of standards, compatibility in operation, parts availability, trained technical support and competent maintenance.
- .3 The system to be capable of detecting the electrical location of each intelligent device. It will be possible to display the intelligent device map on the laptop PC.
- .4 If a device map cannot be generated by the Control Panel, the contractor must include a minimum of (3) days to verify location of all wire runs and conduit.

2.2 Devices

- .1 Smoke Detectors
 - .1 Photoelectric smoke detectors:
 - .1 Intelligent addressable-analog photoelectric type.
 - .2 Twistlock plug-in type with fixed flanged mounting base (isolator base where required).
 - .2 Addressable Interface Modules
 - .1 Zone Addressable Module (FZM):
 - .1 Dual-Zone addressable interface module, to be provided to connect nonaddressable contact devices such as waterflow switches, low pressure switches, sprinkler valve tamper switches and pre-action systems to an addressable signaling circuit.
 - .3 Addressable Relay Module (FRM):
 - .1 Provide relay module for elevator recall, fan shutdown, booster activation and door access release as indicated on riser and floor plans.
 - .2 Controlled source to be electrically isolated from the addressable loop.
 - .4 Line Isolator Modules
 - .1 Install line isolator modules, whenever the analog signal line connected to an analog signaling module, is required to isolate a section affected by a short circuit. When the isolator operates, the balance of input devices located on wiring sections not in the same fire separation shall not be affected by the short and shall continue to function normally.
 - .2 The system shall indicate a short circuit trouble on the loop.
 - .3 Module to mount on an electrical box and have terminals for all wiring connections. When assembled, neither the wiring nor any controls to be exposed.
 - .5 End-of-Line Devices
 - .1 Provide high impact plastic red end-of-line plates with screw terminations as required for all conventional circuits.

2.3 Acceptable Manufacturer

- .1 Manufacturer to be compatible with existing system.

PART 3 EXECUTION

3.1 Installation

- .1 Install systems in accordance with CAN/ULC-S524.
- .2 All conduits and wiring to be new:
 - .1 Wiring to be in accordance with the Canadian Electrical Code.
 - .2 All wiring to be installed in conduit and in accordance with recommendations of manufacturer. All wiring/conduit to be concealed in construction.
 - .3 Connect smoke detectors between red and black conductors at each outlet. Cut red and black conductors at each outlet and connect to terminal screws provided, red to red and black to black.
 - .4 Entire installation to be done under supervision of manufacturer. Upon completion of installation, check entire system to approval and correct any malfunction immediately.
 - .5 Splices are not permitted.
 - .6 Label conductors at panel and each junction point, with plastic wire markers indicating, signal or control circuit number.

- .3 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within a 900mm radius of air outlets. Maintain at least 600mm radius clear space on ceiling, below and around detectors. For detectors located at held open doors, mount detector within 900mm of door on either side.
- .4 Connect sprinkler system alarm and supervisory switches to control panel.
- .5 Program device address to reflect Owner's room names and numbers. Confirm the room names and numbers to be used with the Owner, prior to programming.
- .6 Verification to be provided for all new devices and to conform to CAN/ULC-S537.
- .7 Wire sprinkler flow and tamper device covers so that removal of the cover will produce a trouble signal but not impair an alarm signal from the same device.

3.2 Field Quality Control

- .1 Perform tests in accordance with this Specification and CAN/ULC-S537.
- .2 Fire alarm system:
 - .1 Test such device and alarm circuit to ensure smoke detectors, transmit alarm to control panel and actuate general alarm and ancillary devices.
 - .2 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of trouble signals.
 - .3 Check annunciator panels to ensure zones are shown correctly.
- .3 Provide final PROM program re-burn for system incorporating program changes made during construction.

3.3 Inspection

- .1 Upon completion of work, the fire alarm system must be verified by a contractor/company OTHER than the installing contractor/company. An inspection of all equipment, including those components necessary for the direct operation of the system such as manual stations, detectors and controls is to be performed. The inspection to comprise an examination of such equipment for the following:
 - .1 That the type of equipment installed is that designated by this specification.
 - .2 That the wiring type, installation and connections to all equipment components show that the installer undertook to have observed all applicable codes and standards.
 - .3 That equipment supplied by the manufacturer was installed in accordance with the manufacturer's recommendation and that all devices have been operated or tested to verify their operation. .4 That the supervisory wiring of those items of equipment connected to a supervised circuit is operating and that the governmental regulations, if any, concerning the supervisory wiring, have been met to the satisfaction of inspection officials.
- .2 The manufacturer to supply to the electrical contractor reasonable amounts of technical assistance with respect to any changes necessary to conform to Paragraphs .1, .2 and .4 above. During the period of inspection by manufacturer, the electrical contractor to make available to the manufacturer, electricians as designated by the manufacturer.
- .3 To assist the electrical contractor in preparing his bid, the manufacturer to indicate the number of hours necessary to complete this inspection prior to closing of tenders.
- .4 On completion of the inspection and when all of the above conditions have been complied with, the manufacturer to issue to the Engineer-Architect:
 - .1 A copy of the Inspecting Technician's report showing location of each device and certifying the test results of each device. Provide duplicate copy to Commissioning Agent.

- .2 A certificate of verification confirming that the inspection has been completed in accordance with CAN/ULC-S537 and showing the conditions upon which such inspection and certification have been rendered.
 - .3 The representative of the manufacturer shall provide evidence of technical training on the type of electronic equipment specified herein and shall have at least five (5) years experience with early warning fire detection and control systems.
 - .4 Final test and acceptance of the system shall be witnessed by representatives of three parties: The Owner, the Contractor, the Manufacturer.
 - .5 Service technicians and replacement components for the system specified shall be available within 24 hours from an authorized service representative of the manufacturer who is able to provide evidence of the technical training and authorization by the manufacturer.
- .5 All costs involved in this inspection, both from the manufacturer and the electrical contractor work, to be included in the tender price.

3.4 Warranty

- .1 Provide a written guarantee, signed and issued in the name of the Owner, stating that the fire alarm system is guaranteed against defects in material, workmanship and performance for new devices for a period of two (2) years from the date of the Final Certificate of Completion. CAN/ULC-S537.

END OF SECTION

PART 1 - GENERAL

1.1 Related Work

- .1 Selective Interior Demolition: Section 02 41 19
- .2 Cast-in-Place Concrete: Section 03 30 00
- .3 Mechanical Work: Division 21, 22 & 23

1.2 Protection of Existing Features

- .1 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing any excavation work, notify Architect, establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.
 - .3 Confirm locations of buried utilities by careful test excavations.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered. Obtain direction of Architect before moving or otherwise disturbing utilities or structures.
 - .5 Advise Architect, utility company to remove existing lines in area of excavation. Pay costs for such work.
 - .6 Record location of maintained, re-routed and abandoned underground lines.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Architect, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.
 - .2 Protect existing buildings and surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.
 - .3 Where excavation necessitates root or branch cutting, do so only as approved by Architect.

PART 2 - PRODUCTS

2.1 Materials

- .1 Type 1 and Type 2 fill:
 - .1 Crushed pit run or screened stone, gravel or sand consisting of hard durable particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

Type 1 Fill:

Sieve Size	Percent Passing
125 mm	100
100 mm	95 - 100
75 mm	82 - 100
50 mm	62 - 100
26.5	39 - 100
19	30 - 94
9.5	22 - 80
4.75	16 - 66
2.36	12 - 55
1.18	9 - 44
300 µm	4 - 25

75 µm

0 – 7

Type 2 Fill:

Sieve Size	Percent Passing
37.5 mm	100
31.8 mm	95 - 100
19	70 - 88
12.7	55 - 78
9.5	45 - 72
4.75	30 - 57
2.36	20 - 46
1.18	14 - 35
600 µm	9 - 27
300 µm	5 - 19
150 µm	2 - 12
75 µm	0 - 6

- .3 Type 3 fill: clean, hard, durable sand free from clay, shale or organic matter.
- .4 Existing fill: suitable for re-use upon review approval of Architect.

PART 3 - EXECUTION

3.1 Preparation

- .1 Cut concrete slab neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 19.

3.2 Stockpiling

- .1 Stockpile fill materials in areas designated by Architect. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.3 Excavation

- .1 Excavate to lines, grades, elevations and dimensions indicated for installation of mechanical and electrical services.
- .2 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
- .3 Dispose of surplus and unsuitable excavated material off site.
- .4 Obtain Architect's approval of completed excavation.
- .5 Remove unsuitable material from trench bottom to extent and depth as directed by Engineer/ Architect.

3.4 Fill Types and Compaction

- .1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from Modified Proctor Densities ASTM D1557.
 - .1 Within building area: use Type 1 to under-side of base course for floor slabs. Compact to 95% MPD.
 - .2 Under concrete slabs: provide 6" (150 mm) compacted thickness base course Type 2 fill to underside

of vapour barrier and insulation. Compact base course to 95%. Dress finished top surface with Type 3 fill to close voids. MPD 95%.

- .3 Under service lines: Type 3, 150 mm (6") depth.

3.5 Bedding and Surround of Underground Services

- .1 Place and compact Type 3 granular material for bedding and surround of underground services.

3.6 Backfilling

- .1 Do not proceed with backfilling operations until Architect has inspected and approved installations.
- .2 Place backfill material in uniform layers not exceeding 6" (150 mm) compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .3 Backfill around installations.
 - .1 Place bedding and surround material as specified.
 - .2 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 16" (400 mm).
 - .3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Architect or:
 - .2 If approved by Architect, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Architect.

3.7 Restoration

- .1 Upon completion of work, remove surplus materials and debris and correct defects noted by Architect.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

- .1 This Section specifies requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary to complete excavation of all types of material encountered, placing of backfill, disposal of unsuitable and surplus material and furnishing backfill material as specified below, all as shown on the Drawings and as specified in this Section.
- .2 The work generally includes, but is not necessarily limited to the following items:
 - .1 Trench excavation and backfilling for pipelines, conduit and appurtenances.
 - .2 Structure excavation for structural concrete foundations, manholes, chambers and appurtenances.
 - .3 Supplying and placing material under slabs where required.
 - .4 Control of water by dewatering.
 - .5 Providing borrow material when required.
 - .6 Removal and disposal of surplus and/or unsuitable material.
 - .7 Sheet piling, shoring and bracing to support trench walls, sides of excavations, existing structures or utilities.
 - .8 Backfilling where required.

1.2 Related Work

- .1 Section 31 16 15 – Concrete Curb and Sidewalk.
- .2 Section 31 23 13 – Rough Grading.

1.3 References

- .1 ASTM C33/C33M-16e1, Standard Specification for Concrete Aggregates.
- .2 ASTM D1557-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- .3 ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³)).
- .4 NBDTI Standard Specification for Highway Construction, latest edition.

1.4 Definitions

- .1 Unsuitable material: all organic or excavated material which is not suitable for use in Work and must be disposed of.
- .2 Rock: material which requires drilling, blasting, ripping or breaking up with power operated tools for its removal, and boulders and pieces of concrete exceeding (1) cubic metre in volume. Frozen material will not be classified as rock.
- .3 Topsoil: soil capable of supporting good vegetative growth and suitable for use in top dressing and landscaping.
- .4 Common: materials of whatever nature, which are not included under the definition of solid rock, or topsoil, including dense tills or hardpan which can be ripped and excavated with heavy construction equipment.
- .5 Surplus material: excavated material not required for re-use.
- .6 Subgrade: the surface of mass excavation and embankment finished to lines and elevations indicated.

1.5 Existing Structures and Underground Services

- .1 The Contractor will confirm with appropriate agencies the location of existing underground utilities within the work area. The following agencies and any other infrastructure will be contacted: City of Fredericton, Aliant, Rogers Cable, Enbridge, NB Power.
- .2 Furnish temporary support, adequate protection and maintenance of all underground and surface features encountered in the progress of the work, under the direction of the Authority.
- .3 Restore, upon completion of the work, features which have been disturbed.
- .4 Protect trees, fences, poles and other property and surface structures unless their removal is shown on the Drawings or authorized by the Authority.
- .5 Wherever obstructions not shown on the Drawings are encountered during progress of the work and interfere to such an extent that an alteration in the Works is required, the Authority shall have the authority to change the Drawings and order a deviation from the line and grade or arrange with the owner of the structure for the removal, relocation and reconstruction of the obstructions. The Contractor shall have no claim for any delays resulting from obstructions encountered during the progress of the work.
- .6 Proceed with caution in excavation and preparation of trenches so exact location of all buried pipes and services and underground structures may be determined and be responsible for repair of pipes, services, and structures when broken or otherwise damaged.
- .7 Whenever it is necessary to explore and excavate to determine the location of existing underground utility structures, make such examination and excavation at no additional cost to the Contract.

1.6 Support of Excavation

- .1 Suitably slope or properly shore sides of excavations according to site conditions, all in accordance with the New Brunswick Occupational Health and Safety Act.
- .2 The choice of any method of support shall be the responsibility of the Contractor. However, drawings and calculations for the method of support selected, designed and stamped by a qualified professional engineer registered or licensed in the Province of New Brunswick, and in accordance with the Provincial safety requirements, are to be submitted to the Authority for review before its use.
- .3 If it is desirable that any support, other than that which may be shown on the Drawings, be left in the excavations, then the Authority will issue instructions accordingly.
- .4 Take every precaution against slips or falls, but if any should occur, at once make good the same. If any such slip or fall affects or may affect the stability of the permanent work, execute such remedial work as necessary, including filling up of any space left by the slip or fall with approved granular material. Submit proposed remedial work to Authority for review.
- .5 Excavation and embankment limits are not to encroach upon adjacent property boundaries. Contractor to verify the location of adjacent property boundaries prior to the start of construction. Use methods of support including sheet piling, shoring or other support method as required, at no additional cost to the Contract.

PART 2 – PRODUCTS

2.1 Materials

- .1 Selected Backfill: common material from site excavation, free from stumps, trees, roots, sod, organics, rocks, boulders, masonry and any other deleterious materials. Material to be well graded having a maximum particle size not exceeding 200 mm in diameter. The material shall be free from frost, and shall not be placed on frozen

ground or in water. It must have a moisture content that will allow compaction to the specified densities.

- .2 Common borrow: where material additional to that obtained from excavation on site is required to complete backfilling, provide this material from Contractor's own sources unless otherwise directed. Material shall be as specified for Selected Backfill Material.

<u>Sieve Size</u>	<u>% Passing</u>
125 mm	100
100 mm	95-100
75 mm	82-100
50 mm	62-100
37.5 mm	52-100
19 mm	30-90
9.5 mm	22-79
4.75 mm	16-66
2.36 mm	12-55
1.18 mm	9-44
300um	4-25
75um	0-7

- .3 Pipe foundation material: clear stone which will pass a 75 mm sieve but will be retained on a 50 mm sieve.
- .4 Rip-rap: durable field or quarry stone with rough surfaces and angular shape, minimum thickness not less than one third of length or width and having a minimum of two parallel sides and one plane face at right angles to parallel sides. Rounded stone or boulders will not be permitted. Supply rock spalls to fill open voids. Nominal size of rip-rap 150 mm, with gradation as follows:

100% <	200 mm
30% >	150 mm
80% >	100 mm

- .5 Pipe bedding materials: well graded, clear stone conforming to concrete aggregate as follows:

<u>Sieve Size</u>	<u>% Passing</u>
25.4 mm	100
19 mm	75-100
9.5 mm	0-75
4.75 mm	0-15
2.36 mm	0-5

- .6 Crushed rock base: clean, hard, durable sand, gravel or crushed stone, free from shale, clay, friable material, organic matter and other deleterious substances:

<u>Sieve Size</u>	<u>% Passing</u>
37.5 mm	100
31.5 mm	95-100
25 mm	81-100
19 mm	66-90
12.5 mm	50-57
9.5 mm	41-70
4.75 mm	27-54
2.36 mm	17-43
1.18 mm	11-32
0.300 mm	4-14
0.075 mm	3-8

- .7 Crushed rock subbase: clean, hard, durable sand, gravel or crushed stone, free from shale, clay, friable material, organic matter and other deleterious substances:

<u>Sieve Size</u>	<u>% Passing</u>
100 mm	100
75 mm	95-100
63 mm	85-100
50 mm	73-95
37.5 mm	58-87
19 mm	35-69
9.5 mm	25-54
4.75 mm	17-43
2.36 mm	12-35
1.18 mm	8-24
0.300 mm	4-16
0.75	4-9

- .8 Material under slab: Granular material to be placed under the slab is to form the soil component of an Active Soil Depressurization System (ASD). The system has been designed in accordance with the United States Environmental Protection Agency (EPA) document: Radon Prevention in the Design and Construction of Schools and other Large Buildings, Third Printing with Addendum, June 1994.

A continuous layer of a minimum of 150mm slab granular material is to be placed under the entire slab.

The material to be placed under the slab is to be highly permeable. The materials is to meet the size #5 specifications as defined in ASTM C33/C33M noted below:

<u>Sieve Size</u>	<u>% Passing</u>
37.5 mm	100
25 mm	90-100
19.0 mm	20-55
12.5 mm	0-10
9.5 mm	0-5

- .9 Bedding Material: Bedding material shall consist of approved well graded sand or granular material free of clay, frozen lumps, organic or deleterious matter, and meet the gradation limits specified:

<u>Sieve Size</u>	<u>% Passing</u>
37.5 mm	100
25.4 mm	95-100
19.0 mm	90-100
9.5 mm	60-100
4.75 mm	35-80
2.36 mm	15-60
0.300 mm	0-30
0.075 mm	0-10

- .10 Engineered fill shall consist of 200mm minus shale rock fill for all fill below footings and 150mm minus shale rock fill for all fill above footings placed in lifts not exceeding 300mm and compacted to 95% maximum dry density per ASTM D1557.
- .11 Rigid insulation: to CAN/ULC-S701-1997, Type 4, expanded polystyrene, minimum compressive strength 400 kPa (60 psi).
- .1 Acceptable products: Dow Chemical HI60, Owens Corning Cellar Foamular 600.
- .12 Geotextile: non-woven, needle punched polyester filter fabric.
- .1 Acceptable product: Terrafix 270R, or approved equivalent.

- .13 Note: Fill materials shall be hard, durable shale, pit gravel or quarried rock, free from silt, clay, slate, friable particles, cementation, frozen material, organic matter and other deleterious substances.

PART 3 - EXECUTION

3.1 Excavation - General

- .1 Excavate in all kinds of materials including rock material encountered on Site and make own computations of amounts and nature of excavation required. Stockpile fill materials in areas designated by the Authority.
- .2 Select method of excavation, support and dewatering suitable for the works and as specified in clause 1.5 and as approved by the Authority. Submit proposed method to Authority for review.
- .3 Protect property and structures above and below ground in accordance with the Contract.
- .4 Bear foundations, footings, slabs or undersides of all structures including pipe surrounds on the material as shown on the Drawings and as described in the Specifications and neatly finish all bearing surfaces to the required levels and grades.
- .5 Found excavated surfaces on solid undisturbed ground. If the excavated surface is unsuitable, the Authority will determine what work is required to secure a proper foundation. If such work is due solely to the nature of the ground, then the Authority will measure the work, but if such work is due to any act or default of the Contractor in carrying out of the Works, resulting in disturbance of natural ground conditions, then the Contractor shall execute such work at no additional cost to the Contract.
- .6 Excavation to greater depth than is shown on the Drawings shall be at no additional cost to the Contract, unless ordered by the Authority. At a minimum, the Contractor, shall excavate to the depths shown on the Drawings and make good trench bottom with approved granular material adequately compacted as approved by the Authority.
- .7 Pile excavated material a safe distance away from sides of trench so it will not endanger personnel and the work, reduce sight distances, and obstruct roadways.
- .8 Do not obstruct drainage ditches and natural watercourses.
- .9 The Authority reserves the right to require surplus material to be placed for embanking, general grading or other improvement or use on site, for the general benefit of the Owner.
- .10 Control grading so that the surface of the ground will be properly sloped to prevent water from running into excavated areas. Promptly remove any water which accumulates in excavations.
- .11 Place excavated soil to be re-used as backfill in stockpiles properly graded and sealed against rain.
- .12 All topsoil and loose to compact silty sand is to be excavated and removed from site.
- .13 Excavations for building footings are to extend to rock fill or engineered fill. Where engineered fill is required to raise the excavation to the underside of the footing, the engineered fill is to slope to the bottom of the excavation at a 1:1 slope and the top of the fill is to extend beyond the footing by 0.5m.
- .14 Excavation under the slab and footings shall be a minimum of 300 mm below the bottom of the slab and for footings and a layer of rock fill be placed for drainage.

3.2 Draining, Pumping and Thawing

- .1 Keep all excavations and trenches free of water at all times. Control excavations to prevent surface water running into excavated areas.

- .2 Do all work in connection with dewatering and supply and maintain on the work, pumps, in number and capacity sufficient to keep bottom of all excavations dry and free from water at all times so placing of pipe and manholes, will be done in the dry. Operate all equipment for as long as necessary.
- .3 Dispose of water removed from excavations in a manner that will prevent injuries to public health or private property or to any operation of the work completed or under construction. Do not pump water containing silt or other material in suspension into streams or drainage courses.
- .4 Ensure that all sub-drains, sump holes, wells or the like required for dewatering shall not endanger the stability of the Works. On completion of the work completely backfill and consolidate excavations.
- .5 Excavate, remove or thaw out frozen ground as necessary. Replace excavated material with approved granular material at no additional cost to the Contract.
- .6 Take precautions to prevent uplift of pipe or structures.
- .7 Do not drain water from excavation into sewer unless approved by Authority.

3.3 Rock Excavation

- .1 No material except that described as rock in Clause 1.3.2 of this specification will be classified as rock.
- .2 No soft or disintegrated rock, no loose or previously blasted rock or broken stone smaller than defined volume limits and no rock exterior to the pay limits of the work which may fall into the excavation will be allowed as rock excavation.
- .3 Whenever rock is encountered take the elevation of the exposed rock following excavation. No allowance will be made for rock excavation before such measurements have been made.
- .4 Break rock to a depth of 300 mm below subgrade.

3.4 Trench Excavation

- .1 Trenches for piping and related excavations shall be of sufficient width and depth at all points to allow pipes to be laid, joints to be formed, and appurtenant structures to be built in a workmanlike manner, and when needed, to allow for sheeting and shoring, pumping, draining, and for removing and replacing all materials unsuitable for foundations.
- .2 Excavate trenches so pipe can be laid to the alignment and depth required. Excavation length to be not more than pipe length that can be laid and backfilled in one day. Brace and drain trench so workers may work safely and efficiently.
- .3 Remove organic material and soft deposits to a depth where medium dense to dense materials are encountered as designated by the Authority.
- .4 Do not stockpile excavated materials alongside trench if the bearing soil will cause trench side failure or bottom uplift and affect pipe alignment.

3.5 Unsuitable Material Excavation

- .1 Notify Authority when materials unsuitable for use in the work are encountered and remove to depth and extent as directed by Authority.
- .2 Backfill excavations with pipe foundation material or selected backfill material as directed by the Authority.
- .3 Dispose of unsuitable material off-site at no additional cost to the contract.

3.6 Backfilling - General

- .1 After pipelines and structures have been built, backfill trenches and other excavated areas with materials shown on Drawings or as herein specified. Remove timber and debris from excavation before backfilling is commenced. Do not cover up or put out of view any work until it has been examined, measured, and approved by the Engineer/Architect. If any work is covered without approval of the Engineer/Architect, it must, if required, be uncovered for examination.
- .2 Under Slab: 150 mm thick lift below bottom slab; use The materials is to meet the size #5 specifications as defined in ASTM C33/C33M compacted to 95% maximum dry density per ASTM D1557.
- .3 Bedding surrounding perforated drainage pipe: Use Free Draining Backfill compacted to 90% maximum dry density per ASTM D1557.
- .4 All concrete curb and sidewalk is to be constructed on 300 mm of Granular Sub-Base material and 150 mm of Granular Base.
- .5 Minimum gravels under slab to be 300 mm thick. 150 mm thick lift directly below bottom slab; the material is to meet size #5 specifications as defined by ASTM C33/C33M compacted to 95% maximum dry density per ASTM D1557, as per 2.1.10 of this section. Bottom lift to be 150 mm thick layer of 31.5 mm minus NBDTI crushed rock. Engineered fill under the slab is to be 75 mm minus crushed rock meeting NBDTI subbase specification or approved equivalent.
- .6 A 150 mm layer of 31.5 mm minus NBDTI crushed rock base is to be placed under all footings.
- .7 If additional fill is required under footings, engineered fill is to extend beyond the footing by 0.5 m and slope away from the foundation at 1:1 to competent material. Engineered fill is to be 75 mm minus crushed rock meeting NBDTI subbase specification or approved equivalent. See Gemtec Geotechnical Report for borehole information.
- .8 Perimeter frost walls to be backfilled with a clean granular material having less than 10% fines (% passing the 0.080 mm sieve size. Material to meet Class "A" backfill for structures (NBDTI Standard Specifications for Highway Construction, Table 167-1) or approved equal.

3.7 Backfilling Structures

- .1 After installation of structures, clean excavations of trash and debris. Backfill shall consist of selected backfill material or material shown on Drawings. Place material to meet following requirements and approval of the Authority.
 - .1 Place backfill in horizontal layers not more than 300 mm deep.
 - .2 Compact each layer by rollers, mechanical tampers, or other suitable equipment to obtain a density of not less than 95% standard Proctor density.
- .2 Backfill with 200mm minus shale rock fill for all fill below footings and 150mm minus shale rock fill for all fill above footings.

3.8 Backfilling Trenches

- .1 Backfill trench from top of bedding to top of subgrade using pit run gravel subbase.
- .2 Place backfill in 300 mm layers and compact to 98% standard Proctor density. Thoroughly compact each layer before placing next layer.
- .3 During backfilling, keep trenches free of water at all times and controlled so as to prevent surface water running into excavated areas. Remove silty materials which become wetted and subsequently liquid or extremely plastic.

- .4 Leave surface of backfill initially high and repair settlement of trench backfilling.

3.9 Clean-up

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

END OF SECTION



City of Saint John

CONTRACT SPECIFICATIONS

DIVISION 4

FORM OF TENDER

OCTOBER 2023



City of Saint John

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4.1 TENDER IDENTIFICATION

Tender No: 2023-085105T

Title of Work: Renovations and Elevator Addition – St. Patrick Street Pedway

4.2 TENDERER'S RESPONSIBILITIES AND AGREEMENT

TO THE CITY OF SAINT JOHN, NEW BRUNSWICK:

The undersigned hereby agrees that failure to complete all required parts of the Form of Tender shall be subject to the reserved rights of the City and shall be grounds for rejection of the Tender in accordance with Section 2.11.

The undersigned Tenderer has carefully examined the site of the Work described herein, has become familiar with local conditions and the character and extent of the Work, has carefully examined every part of the proposed Contract, and thoroughly understands its stipulations, requirements and provisions and has carefully examined all of the following documents which together comprise the Tender Documents:

1. Project Description (Division 1)
2. Instructions to Tenderers and Tendering Procedures (Division 2)
3. The Particular Specifications (Division 3)
4. The Form of Tender (Division 4)
5. The Form of Agreement (Division 5)
6. The General Specifications (Divisions 6 through 31)
7. The Plans and Drawings
8. Addenda Issued

together, the "Tender Documents".

The undersigned Tenderer has determined the quality and quantity of materials required, has investigated the location and determined the source of supply of materials required, has investigated labour conditions, and has arranged for the continuous execution of the Work herein described.

The undersigned Tenderer hereby agrees to be bound by the award of the contract, and if awarded the Contract, to sign the Form of Agreement (Division 5) within five (5) working days following the City's Notice of Selection.

In the event the City accepts its Tender, the undersigned Tenderer hereby agrees to Substantially Complete the Work no later than October 31, 2024.

The undersigned Tenderer agrees that they have received all Addenda and the Tender Price includes the provisions set out in the Addenda.



4.2 TENDERER’S RESPONSIBILITIES AND AGREEMENT (Cont’d)

The undersigned Tenderer further agrees to provide all necessary permits, approvals, labour, material, plant, equipment, tools, incidentals, products, water, light, heat, power, transportation, facilities, services and other means of the specified requirements which are necessary to complete the work in accordance with the contract and agrees to accept, therefore, in payment in full, the unit prices stated herein in the *Schedule of Quantities and Unit Prices*, plus applicable taxes, for the actual quantities performed in accordance with the drawings and specifications, for the total sum of

in Canadian Funds, which price includes HST (the “Tender Price”).

By submitting a Tender, the Tenderer absolutely waives any right, cause of action or claim for any compensation of any kind whatsoever as a result of participating in this Request for Tender Call or by reason of the City’s failure to accept the Tender submitted by the Tenderer, and the Tenderer shall be deemed to have agreed to waive such right, cause of action or claim.

Place of Signing: Signed, sealed and delivered at _____

Date of Signing: This _____ day of _____, in the year _____

Name and Title: By _____

Legal Name of Tenderer: _____ *PLACE*

Signature of Tenderer or Authorized Agent: _____ *SEAL*

Signature of Witness: _____ *HERE*

Address of Tenderer: _____

4.3 **BONDING AND INSURANCE COMMITMENTS**

Failure of the Tenderer to complete Sections 4.3.01, 4.3.02 and 4.3.03 may be grounds for rejection of the Tender.

4.3.01 **Tender (Bid) Bond or Certified Cheque**

A certified cheque or Tender (Bid) Bond accompanies this Tender, as indicated below:

(a) **Certified Cheque**

Provided is a certified cheque payable to The City of Saint John in the amount of _____

Signature of Tenderer or Authorized Agent: _____

(b) **Tender (Bid) Bond**

Provided is a Tender (Bid) Bond payable to The City of Saint John in the amount of _____

The Tender (Bid) Bond has been negotiated for, procured from and the premium paid to a New Brunswick agent of an insurance company licensed to do business in New Brunswick.

Signature of Tenderer or Authorized Agent: _____

4.3.02 **Performance Guarantees**

One of the following acceptable forms of Performance Guarantees will accompany the Contract, as indicated below:

Performance Bond and the Labour and Material Payment Bond

The Performance Bond and the Labour and Material Payment Bond, each at fifty percent (50%) of the Tender Price covering the faithful performance of the full Contract, will be issued by an insurer licensed under the *Insurance Act* to transact guarantee insurance or surety insurance.

The Performance Bond and the Labour and Material Payment Bond shall be in the form prescribed by the regulations under the *Construction Remedies Act*. Where permitted pursuant to the *Construction Remedies Act* and where specifically allowed and called for in the Tender Documents as being permitted, the City may allow alternate forms of security.

A surety consent letter or Agreement to Bond must accompany the Tender submission.

Signature of Tenderer or Authorized Agent: _____

4.3.03 Insurance

The undersigned Tenderer has reviewed the insurance requirements in the Contract. The following provision for contract insurances will be utilized, as indicated below:

The insurance required in the contract will be negotiated for, procured from and the premium paid to an insurance company licensed to do business in the Province of New Brunswick.

Signature of Tenderer or Authorized Agent: _____

4.4 STATEMENTS

A Tender which does not include completed statements at Sections 4.4.01 to 4.4.07 hereunder and the duly completed Schedule of Quantities and Unit Prices at Appendix 4A may be Disqualified.

4.4.01 Reference Regarding Tenderer’s Financial Status

Name of Reference: _____

Address of Reference: _____

4.4.02 Particulars of Tenderer’s Recent Contracts

The Tenderer shall provide hereunder particulars of at least three (3), and if possible, five (5) contracts which the Tenderer has successfully carried to completion within the last three (3) years, or is now carrying to completion.

Tenderers shall be actually engaged in performing the type and standard of work specified, and the projects referenced below shall be work of a similar character to the Work now being tendered and shall be of comparable or greater size.

Tenderers who have not performed work for The City of Saint John within the last three (3) years shall submit additional information with the Form of Tender that would demonstrate the Tenderer’s ability to perform the type and standard of work specified and the Tenderer’s financial, technical and project management reliability.



4.4.02 Particulars of Tenderer’s Recent Contracts (Cont’d)

Contract 1: Brief description of contract: _____

Owner, contact name and telephone number: _____

Contractor's supervisor: _____

Year completed: _____ Contract Value: _____

Contract 2: Brief description of contract: _____

Owner, contact name and telephone number: _____

Contractor's supervisor: _____

Year completed: _____ Contract Value: _____

Contract 3: Brief description of contract: _____

Owner, contact name and telephone number: _____

Contractor's supervisor: _____

Year completed: _____ Contract Value: _____



4.4.02 Particulars of Tenderer’s Recent Contracts (Cont’d)

Contract 4: Brief description of contract:

Owner, contact name and telephone number: _____

Contractor's supervisor: _____

Year completed: _____ Contract Value: _____

Contract 5: Brief description of contract:

Owner, contact name and telephone number: _____

Contractor's supervisor: _____

Year completed: _____ Contract Value: _____

Contract 6: Brief description of contract:

Owner, contact name and telephone number: _____

Contractor's supervisor: _____

Year completed: _____ Contract Value: _____



4.4.03 Particulars of Current Construction Work by Tenderer

If none of the projects described in 4.4.02 were in progress in Canada during the twelve (12) months immediately preceding this Tender, the Tenderer shall provide below particulars of a contract which the Tenderer satisfactorily carried out in Canada during that period.

Brief description of contract: _____

Owner, contact name
and telephone number: _____

Date of commencement: _____

Date of (anticipated) completion: _____

Contract value: _____

Contractor’s supervisor: _____

4.4.04 Tenderer’s Senior Supervisory Staff

The Tenderer shall identify their senior supervisory staff in the spaces below.

Tenderers who have not performed work for the City within the last three (3) years shall submit with their Form of Tender a completed resume for each staff member listed hereunder outlining their experience, education, designations/certificates and continued training/education.)

<u>Name</u>	<u>Position</u>	<u>Qualifications</u>	<u># Years Experience</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____



4.4.05 Tenderer’s Plant

The Tenderer shall list below the construction plant (type of machinery, equipment, trucks, etc.) the Tenderer proposes to use, other plant under the Tenderers control, and the plant the Tenderer proposes to hire, to complete the work within the time allowed.

<u>Type</u>	<u>Make</u>	<u>Model # & Year</u>	<u>Gas/ Diesel</u>	<u>Net Engine Horsepower</u>	<u>Bucket Size Excavator GVW</u>

4.4.06 Tenderer’s Other Resources

The Tenderer shall list below the batch plant, gravel pits or quarries, and the like that the Tenderer proposes to use to complete the work within the time allowed.

4.4.07 Sub-Contractors and Suppliers

Tenderers shall state the name and address of each proposed sub-contractor or supplier.

The listing of more than one sub-contractor or supplier for any one sub-trade or failure to submit a complete list of sub-contractors and suppliers may be grounds for rejection of the Tender. After the City has provided the selected Tenderer with written notification of the City's acceptance of its Tender, the selected Tenderer shall not substitute other sub-contractors or suppliers in place of those named below without the written approval of the Engineer.

<u>Sub-Trade or Supplier</u>	<u>Name of Sub-Contractor/Supplier</u>	<u>Address</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

4.5 SCHEDULE OF QUANTITIES AND UNIT PRICES

The tenderer shall complete and attach as Appendix 4A the required *Schedule of Quantities and Unit Prices* for the Work tendered, in the format specified by the Engineer.

4.6 CERTIFICATE OF INDEPENDENT TENDER DETERMINATION

I, the undersigned, in submitting the accompanying Tender to The City of Saint John for:

Tender No.: _____

Title of Work: _____

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of _____ that:

(Corporate Name of Tenderer)

4.6 **CERTIFICATE OF INDEPENDENT TENDER DETERMINATION (Cont'd)**

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying Tender will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the Tenderer to sign this Certificate, and to submit the accompanying Tender, on behalf of the Tenderer;
4. Each person whose signature appears on the accompanying Tender has been authorized by the Tenderer to determine the terms of, and to sign, the Tender, on behalf of the Tenderer;
5. For the purposes of this Certificate and the accompanying Tender, I understand that the word “competitor” shall include any individual or organization, other than the Tenderer, whether or not affiliated with the Tenderer, who:
 - (a) may submit a Tender in response to this Request for Tender;
 - (b) could potentially submit a Tender in response to this Request for Tender, based on their qualifications, abilities or experience;
6. The Tenderer discloses that (check one of the following only, as applicable):
 - the Tenderer has arrived at the accompanying Tender independently from, and without consultation, communication, agreement or arrangement with, any competitor; or
 - the Tenderer has entered into consultations, communications, agreements or arrangements with one or more competitors regarding this Request for Tender, and the Tenderer discloses, in the attached document(s), complete details thereof, including the names of the competitors and the nature of, and reasons for, such consultations, communications, agreements or arrangements.
7. In particular, without limiting the generality of paragraphs (6)(a) or (6)(b) above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) prices;
 - (b) methods, factors or formulas used to calculate prices;
 - (c) the intention or decision to submit, or not to submit, a Tender; or
 - (d) the submission of a Tender which does not meet the specifications of the Request for Tender;except as specifically disclosed pursuant to paragraph (6)(b) above;

4.6 CERTIFICATE OF INDEPENDENT TENDER DETERMINATION (Cont'd)

- 8. In addition, there has been no consultation, communication, agreement or arrangement with any competitor regarding the quality, quantity, specifications or delivery particulars of the products or services to which this Request for Tender relates, except as specifically authorized by The City of Saint John or as specifically disclosed pursuant to paragraph (6)(b) above;

- 9. The terms of the accompanying Tender have not been, and will not be, knowingly disclosed by the Tenderer, directly or indirectly, to any competitor, prior to the date and time of the official Tender Opening, or of the awarding of the Contract, whichever comes first, unless otherwise required by law or as specifically disclosed pursuant to paragraph (6)(b) above.

Name of Tenderer or Authorized Agent: _____

Signature of Tenderer or Authorized Agent: _____

Position Title: _____

Date: _____

Address of Tenderer: _____

ATTACHMENT: TENDERER'S CHECKLIST

(The onus is entirely on the Tenderer to understand all the requirements of the tendering process and the Tender Documents. This checklist is provided for information only and is not required to be submitted with the Form of Tender.)

BEFORE SUBMITTING YOUR TENDER, CHECK THE FOLLOWING POINTS:

- Has your Tender been signed and witnessed?
- Have you sealed the *Form of Tender* with your corporate seal?
- Have you enclosed your Tender (Bid) Bond or certified cheque?
- Have you enclosed the surety consent letter?
- Have you completed all sections of the *Form of Tender*?
- Have you completed all schedules and prices in the *Form of Tender*?
- Have you written each unit price or lump sum price out in words, including the words "dollars" and "cents"?
- Have you included signed copies of all addenda signature pages?
- Have you listed your Subcontractors and suppliers?
- Have you listed your experience in similar work?
- Have you listed your senior staff?
- Have you listed the Tenderer's plant?
- Have you attached required appendices and required supplemental information?
- Are the documents complete?
- Is everything legible?

PLEASE MAKE SURE THAT YOU:

- (a) Place the Tender in an envelope;
- (b) Seal the envelope;
- (c) Put the Tender number, title of Work and closing date and time on the sealed envelope;
- (d) Put the full legal name and return address of the Tenderer on the envelope; and
- (e) Deposit the envelope in the Tender Box located at 175 Rothesay Avenue, 1st Floor, Saint John, N.B.

DIVISION 4.5

SCHEDULE OF QUANTITIES AND UNIT PRICES

CONTRACT NUMBER 2023-081205T

TITLE: Renovations and Elevator Addition - St. Patrick Street Pedway

**UNIT PRICE TO BE EITHER
TYPEWRITTEN OR PRINTED IN
INK IN WORDS AND PRINTED
NUMERICALLY**

NOT APPLICABLE



City of Saint John

CONTRACT SPECIFICATIONS

DIVISION 5

FORM OF AGREEMENT

OCTOBER 2023



City of Saint John

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5.1 AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT made in triplicate between **THE CITY OF SAINT JOHN** herein (and in the Specifications) called the "Owner" or the "City"

AND

_____ herein (and in the Specifications) called the "Contractor".

WITNESSETH: That the Owner and the Contractor agree as follows:

- (a) The Contractor shall provide all the materials and perform all the work shown on the drawings and described in the Contract Specifications titled:

Contract No: _____

Title: _____

- (b) The Contractor shall do and fulfill everything indicated by this Agreement; and
- (c) The Contractor shall Substantially Complete the Work no later than _____ .

5.2 CONTRACT DOCUMENTS

5.2.01 General Specifications

General Specifications, City of Saint John, New Brunswick, with all applicable divisions, as updated and as listed in the Table of Contents of the Contract Specifications.

5.2.02 Contract Specifications

Contract specifications for

Contract No: _____

Title: _____

City of Saint John, New Brunswick,

5.2.03 Drawings

5.3 ADDENDA

The Contractor agrees that he has received addenda ___ to ___ inclusive, and that the tender price includes the provisions set out in the addenda.

5.4 CONTRACT PRICE

The Owner shall pay to the Contractor, in lawful money of Canada for the performance of the Contract, the amounts determined for each of the items of work completed at the unit prices as listed in the Schedule of Quantities and Unit Prices, plus applicable taxes, submitted with the tender, which is to be attached with this Agreement, for the total tender price of:

If the Engineer orders in writing the performance of any work not covered by the drawings or included in the specifications that cannot be classified as coming under any of the contract units and for which a unit price can be agreed upon, then such additional work shall be paid for as described under the General Administration of Contract, Division 6.

5.5 PAYMENT

The Owner shall pay on account of thereof upon the Engineer's Certificate, as invoiced by the Contractor and approved by the Engineer, in the manner described in the Specifications.

5.6 AGREEMENT DOCUMENTS

The General Administration of Contract, Division 6 and the aforesaid Specifications and Drawings are all to be read into and form part of this Agreement and the whole shall constitute the Contract between the parties and it shall inure to the benefit of and be binding upon them and their successors, executors, administrators, and subject to the General Administration of Contract, their assigns.



5.7 EXECUTION OF AGREEMENT

In Witness Whereof the parties hereto have executed this Agreement.

) SIGNED, SEALED AND DELIVERED
)
) this _____ day of _____, _____
)
) by _____
) (Contractor)
)
) _____
) (Witness) (Signature)
)
) _____
) (Name and Title) (Name and Title)
)
) _____
) (Signature)
)
) _____
) (Name and Title)
)
)
) PLACE SEAL HERE

)
)
) SIGNED, SEALED AND DELIVERED
)
) this _____ day of _____, _____
)
) by THE CITY OF SAINT JOHN.
)
) _____
) MAYOR
)
) _____
) COMMON CLERK
)
)
)
) PLACE SEAL HERE



5.8 AFFIDAVIT OF CORPORATE EXECUTION

CANADA
PROVINCE OF NEW BRUNSWICK
CITY OF SAINT JOHN

I, _____, of the _____
in the County of _____, and Province of New Brunswick

MAKE OATH AND SAY:

- (1) THAT I am the _____ of _____, and _____ is the _____ of the said Company, as such I am/we are duly authorized officer(s) of the said Company to execute the foregoing instrument.
- (2) THAT the signature _____ subscribed to the within instrument is my signature and in my own proper handwriting and that the signature _____ so subscribed is his signature made thereto by him in my presence.
- (3) THAT the Seal affixed to the said instrument purporting to be the Corporate Seal of the said _____ is the Corporate Seal of the said Company and was affixed to the said instrument by me and by order of the Board of Directors of the Company.

SWORN TO BEFORE ME at the _____)
 _____)
 of _____)
 _____)
 in the Province of _____)
 _____)
 this ____ day of _____ A.D., _____.)
 _____)
 _____)
 COMMISSIONER OF OATHS) CONTRACTOR
 _____)

Note: The blank spaces are to be filled in with the name or names of the signing officer(s).

5.9 **CHECKLIST FOR INSURANCE REQUIREMENTS**

The insurance coverage required by the City is set out in General Administration of Contract, Division 6, of the General Specifications. An Insurance Certificate is to be deposited with the City.

The certificate of insurance should contain at least the following information:

- Be addressed to the City of Saint John.
- Be signed by an authorized representative on behalf of the insurance company.
- Contain a Wrap-up (Project Specific) Liability policy with inclusive limits of at least five million dollars (\$5,000,000.00).
- Show that the City of Saint John, the Contractor and Sub-Contractors, the Engineer and the Architect, are added as Additional Insured with respect to the operations of the Contractor.
- Confirm coverage for bodily injury and property damage and set forth the amount.
- Confirm that there is coverage for Contractual Liability with respect to this Contract.
- Confirm that the policy contains a cross liability clause.
- Confirm that there is Contingent Employer's Liability Coverage.
- Confirm that there is coverage for Broad Form Property Damage.
- Confirm that there is Completed Operations coverage with respect to this contract and that such coverage shall continue to be in force for the duration of the guarantee period (maintenance period) which is a period of twelve (12) months from the date of issuance of the Certificate of Final Completion.
- Confirm that there is coverage for Non-Owned Automobiles or licensed vehicles.
- Confirm that there is coverage for Owned Automobiles or licensed vehicles.
- Confirm that the indicated policies will not be cancelled, substantially amended, or allowed to lapse without the City first being given a thirty (30) day written notice.