TRINITY COLLEGE SCHOOL

EXTERIOR BRICK AND INTERIOR IMPROVEMENT

JOHNSON BLOCK UPPER GYM

55 Deblaquire Street North, Port Hope, Ontario

ISSUED FOR TENDER

Project 26035 **DATE** May 28th, 2026

BARRY BRYAN ASSOCIATES
Architects, Engineers, Project Managers

250 Water Street
Suite 201
Whitby, Ontario
Canada
L1N 0G5

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DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 – GENERAL REQUIREMENTS

DIVISION 02 – EXISTING CONDITIONS

DIVISION 04 – MASONRY

DIVISION 05 – METALS

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

End of Section

PART 1 GENERAL

1.1 General

.1 Stipulated Price tenders are invited for the supply of all labour, material, equipment, and services to complete the work for the **Renovation for the Exterior Brick Improvements and Interior Renovations for Johnson Block Upper Gym, 55 Deblaquire Street North, Port Hope, Ontario for Trinity College,** in accordance with the Drawings and Specifications prepared by Barry Bryan Associates.

.2 Bids from **Prequalified** General Contractors will be received by **Barry Bryan Associates c/o Trinity College School** before **2:00:00 p.m**. local time, as determined by the clock located in the reception at BBA's office on **Thursday, June 11, 2026.**

.3 The Tender Documents including the Contract Form (Canadian Standard Form of Agreement between owner and Contractor, Canadian Standard Construction Document CCDC 2, 2020), as amended by the Supplementary General Conditions, the Instructions to Bidders, Specifications, Tender Form, and the Drawings are all complementary and shall be read together.

.4 A **mandatory** pre-bid meeting for Invited General Contractors will take place on **Thursday June 4th, 2026 at 10:00 am.** at the site located at **55 Deblaquire Street North, Port Hope, Ontario for Trinity College (meet at north east barns area)**. Failure to attend the meeting will disqualify the prospective bidder's tender. Each bidder will have the opportunity to examine the site, all areas and services which may affect the proper execution of the work. No claim for extra payment will be allowed for work or difficulties encountered due to conditions of the site which were visible or reasonably inferable prior to the date of submission of tenders.

.5 Only tenders received in accordance with these Instructions from Invited General Contractors will be accepted.

.6 Each Bidder shall examine the Tender Documents as soon as possible after receipt thereof, and should he discover any errors or omissions therein he shall notify the Consultant as soon as possible so that further instructions and/or Drawings may be issued to all Tenderers before the date set for receiving Tenders.

.7 Individual drawings, partial sets of drawings and individual sections of the specifications are not available.

.8 Bidders shall be responsible for the distribution of all Contract Documents and Addenda to all Subcontractors and suppliers.

.9 No claims for payment will be accepted because of failure on the part of the owner, the Consultant, or their representatives to supply any Subcontractor with all or part of the Contract Documents and Addenda thereto, which will have been supplied to the Bidder up to the closing date.

.10 The Contractor shall obey all Federal, Provincial and Municipal Laws, Acts, Ordinances, Regulations, Orders-in-Council and By-laws which could in any way pertain to the work outlined in the Contract or to the employees of the Contractor. Without limiting the generality of the foregoing, the Contractor shall satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a supplier, a Constructor and/or Employer with respect to or arising out of the performance of a Contractor's obligations under this contract.

.11 The successful bidder shall at their own expense within 10 days of notification of acceptance and prior to the commencement of work, obtain and maintain until the termination of the contract or otherwise stated, provide the Owner with evidence of:

.1 Commercial General Liability Insurance issued on an occurrence basis for an amount of not less than $5,000,000 per occurrence / $5,000,000 annual aggregate for any negligent acts or omissions by the contractor relating to its obligations under this Agreement. Such insurance shall include but is not limited to bodily injury and property damage including loss of use; personal injury; contractual liability; premises, property & operations; non-owned automobile; broad form property damage; broad form completed operations; owner s & contractors protective; occurrence property damage; products; employees as Additional Insured(s); contingent employers liability; tenants legal liability; cross liability and severability of interest clause.

.1 Such insurance shall add Trinity College School and Barry Bryan Associates as Additional Insured with respect to the operations of the contractor. This insurance shall be non-contributing with and apply as primary and not as excess of any insurance available to Trinity College School and Barry Bryan Associates. The successful contractor shall indemnify and hold Trinity College School and Barry Bryan Associates harmless from and against any liability, loss, claims, demands, costs and expenses, including reasonable legal fees, occasioned wholly or in part by any negligence or acts or omissions whether willful or otherwise by the contractor, their agents, officers, employees or other persons for whom the contractor is legally responsible.

.2 Automobile Liability Insurance respect to owned or leased vehicles used directly or indirectly in the performance of the services covering liability for bodily injury, death and damage to property with a limit of not less than $2,000,000 inclusive for each and every loss.

.3 The Policies shown above shall not be cancelled unless the Insurer notifies Trinity College School and Barry Bryan Associates in writing at least thirty (30) days prior to the effective date of the cancellation. The insurance policy will be in a form and with a company which are, in all respects, acceptable to Trinity College School.

1.2 Tender Submissions

.1 The Tender Form, on the forms provided shall be filled in exactly as required.

.2 Bidders shall complete and return one (1) set of Tender Forms.

.3 Tenders must be email submitted clearly identified with the project name, and the name and address of the tenderer.

.4 Email receipt will be considered as time stamp, late bids will not be accepted.

.5 Tender Forms shall be completed in a legible manner without alterations or erasures. Incomplete tenders will not be considered.

.6 Late tenders will not be accepted and will be returned unopened.

.7 Each Tender shall state the stipulated PRICE/PRICES for which the Bidder will undertake to carry out all the Work as described and/or shown in the Tender Documents.

.8 Bidders shall furnish all information requested and fill in all blanks in the Tender Form and should any uncertainty arise as to the proper manner of completing the form, the requisite information will be given by the Consultant.

.9 Incorporated Companies must attach Corporate Seal and Signatures of proper officers shall be affixed.

.10 All prices (unless otherwise specifically requested in the Tender Documents) shall be "Work completed" prices, and shall be understood to include all material, labour and other expenses including fees, insurance, compensation and other items required by governing regulations, as well as overhead and profit for the work concerned.

.11 It shall be understood that the Stipulated Price shall be open for acceptance and irrevocable for a period of thirty (30) days.

1.3 Addenda

.1 Bidders may, during the tendering period, be advised by Addenda of required additions to, deletions from, clarifications to, or alterations in the requirements of the Tender Documents. All such changes shall become an integral part of the Tender Documents and shall be allowed for in the Stipulated Price.

.2 Insert, in the space provided in the Bid Form, the Addenda numbers of all Addenda received during bidding period. If no Addenda have been received, the word "NONE" shall be inserted in the space provided.

.3 Failure to acknowledge addenda shall result in a rejected tender.

1.4 Queries During Bidding Period

.1 All communication from Bidders in respect with this Tender will cease at 12:00 noon on Friday June 5th, 2026

.2 Address queries regarding Bid Documents during bidding period to:
Barry Bryan Associates
250 Water Street
Suite 201
Whitby, Ontario L1N 0G5
Telephone No: (905) 666-5252
Facsimile No: (905) 666-5256
email: kbhuiyan@bba-archeng.com
Attention: Mr. Kam Bhuiyan

1.5 Base Bid Tenders

.1 Materials and equipment are specifically described and named in this Specification to establish a standard of materials and workmanship to which the Bidders shall strictly adhere. Where manufacturer's trade names are used, the Stipulated Price shall be based on the use of such materials and equipment as specified, no substitutions will be allowed.

.2 Bidders may submit with their tender proposed alternatives based on the use of alternative material equivalent to the materials or equipment specified in quality and performance and provided clearances and dimensions shown on the drawings are maintained. For all such alternative proposals the Bidder shall include the appropriate information in Appendix ‘A’-Bidder Proposed Alternative Prices to the Tender form and supplementary information as follows:

.3
- .1 Item Specified.
- .2 Proposed Substitution or Addition including manufacturer's name, supplier's name, and product identification.
- .3 Change in price if any.
- .4 A letter attached to Appendix 'A' including the reason for the proposed substitution and a detailed description of alternative including identification of differences from specified products along with a statement assuming full responsibility that any equipment shall not exceed the space requirements allocated on the drawings. The successful Bidder shall be responsible for any additional design architectural, or engineering costs as may be incurred by the Consultant, and any installation cost resulting from the acceptance of a substitute piece of equipment or product.
- .5 The Tenderer further agrees to submit product material specifications, samples, technical data, references, or any other supporting documentation upon request, as may be necessary for the owner and Consultant to evaluate any proposed Alternative.
- .6 Under no circumstances shall the value of an alternative material or equipment be included in the Stipulated Price.
- .7 Under no circumstances will alternatives submitted after the closing of Tenders be considered.
- .8 The owner reserves the right to accept or reject proposed alternatives as he sees fit, and also to claim for himself the financial benefit of a substitution, if a substitution is accepted. A rejection by the owner of the proposed alternative is final and the owner does not become obligated to give any reason for his action.

1.6 Tenders Not Necessarily Accepted

.1 The owner reserves the right to:
- .1 Cancel the Tender at any time prior to acceptance of a bid;
- .2 Reject any or all bids;
- .3 Accept the Tender in whole or in part;
- .4 Reject any tender where satisfactory evidence of sufficient capital, plant capacity and experience to successfully prosecute and complete the work in the specified time, is not furnished by the bidder;
- .5 Not accept the lowest or any tender.

.2 Tenders containing escalation clauses will not be considered.

.3 Without limiting the generality of the foregoing, any tender which is incomplete, illegible, or obscure, or which contains alterations not called for, or irregularities of any kind, may be rejected.

.4 Should a dispute arise from the terms and conditions of this contract regarding meaning, intent or ambiguity, the decision of the owner shall be final.

1.7 Taxes

.1 Award of Contract shall be based on the lowest compliant bid EXCLUDING applicable taxes.

.2 Applicable taxes are to be shown separately.

1.8 Time of the Essence

.1 Bidders are cautioned that time is of the essence in this Contract and that the ability to complete the Work within the stipulated time period will be one of the factors considered in the award of the Contract.

.2 Upon commencing work on site, all work must continue until completion without delay or work stoppage unless instructed otherwise by the owner.

.3 The Contractor shall perform the work on a Monday to Friday basis between the hours of 7:00 am and 6.00 pm, unless otherwise directed by the owner. The owner may require that work be restricted at certain times and will provide a minimum of 3 days written notice of such times.

.4 The Contractor shall refrain from work on Statutory Holidays recognized by the owner. Under special circumstances, approval may be given for work on Statutory Holidays, at the discretion of the owner. The Contractor will submit written notification at least four (4) days in advance of the Statutory Holiday on which he desires to work, indicating the location and nature of the work to be performed. The Contractor must obtain written permission from the owner authorizing work on a specific Statutory Holiday.

.5 Work shall be completed in accordance with the following schedule:
.1 Commencement Date: June 22nd, 2026
.2 Substantial Performance Date: August 21st, 2026
.3 Total Performance Date: September 1st, 2026

.6 The Contractor will be required to provide all labour, material and equipment and direct his subcontractors and suppliers to work the number of shifts and days that are necessary to meet the owner 's schedule.

.7 Bidders shall allow in their Stipulated Price for all premium time and other costs as necessary to meet the required completion date.

1.9 Execute Contract

.1 The Successful Bidder shall execute the Contract Documents within ten (10) calendar days of receipt of notification of Acceptance of Tender from the owner.

.2 The Successful Bidder shall commence the Work at the site within three (3) calendar days of receipt of Notification to Commence Work and complete all construction to the satisfaction of the owner and the Consultant according to the schedule indicated in Article 1.8.

.3 Failure by the Successful Bidder to meet the above requirements will entitle the owner to cancel the award of the Contract. The owner may then award the Contract to one of the other bidders or to take such other action as he chooses.\

1.10 Location

.1 The site is located at 55 Deblaquire Street North, Port Hope, Ontario.

1.11 Completion Security

.1 The successful Contractor shall provide a Performance Bond, and a Labour and Materials Payment Bond, each in an amount equal to 50% of the total contract sum as accepted, to guarantee his faithful performance of this Contract and his fulfilment of all obligations in respect of payment for labour and materials used on this work. Bonds shall be issued by a Guarantee Surety Company, licensed to issue such instruments in the Province of Ontario, having been properly executed and in other respects acceptable to the owner.

.2 An “Agreement to Bond” from a surety acceptable to the owner, ensuring that a Performance Bond and/or Labour and Materials Payment Bond can be supplied constitutes part of the Tender and must be completed, duly signed, and executed, and returned with the Tender in the enclosed envelope. Failure to provide the required Agreement to Bond Form will result in rejection of the bid.

1.12 Workplace Safety and Insurance Board

.1 The Contractor will be required to submit to the owner a statement from the Workplace Safety & Insurance Board, that all assessments the Contractor is liable to pay under the Act or successor legislation have been paid. Such statement or Certificate of Clearance shall be provided prior to the issuance of the Contractor's last payment and at any other time when requested to do so.

1.13 Procedures to be Used if the Tender Exceeds Owner’s Budget

.1 The procedures recommended in CCDC Document 23 will be used.

.2 In the event that all Bids received exceed the owner’s budget, the owner will negotiate changes in the scope of the work with the bidder submitting the lowest acceptable Bid. When the negotiations result in a Contract Price acceptable to both parties, no re-bidding of the project is necessary, and the Contract should be awarded at the negotiated price.

.3 If negotiations fail to produce a Contract Price acceptable to both parties, or if, in the first instance, the changes contemplated result in a value in excess of 15%, the Bid Documents may be amended and invitations to re-bid be restricted to the three (3) lowest acceptable Bids on the original Bid Call.

1.14 Cash Allowances

.1 Include in the Stipulated Price, the following cash allowances:

.1	Independent inspection and testing	$ 10,000.00
.2	**TOTAL CASH ALLOWANCES**	**$ 10,000.00**

.3 Cash Allowance for independent testing and inspection will be assigned an abatement sub-trade by Trinity College School to complete the necessary abatement.

End of Section

BRICK RESTORATION AND INTERIOR IMPROVEMENTS
JOHNSON BLOCK UPPER GYM
Trintiy College School

Name of Firm

Address

Postal Code

Telephone No. Fax Number

Email Address

Name of Person Signing for Firm

TENDERS RECEIVED BY:
Mr. Kam Bhuiyan
Barry Bryan Associates
250 Water Street,
Whitby, Ontario,
Kbhuiyan@bba-archeng.com

To: **Barry Bryan Associates**
250 Water Street, Whitby,
Ontario, L1N 0G5
c/o
Trinity College School,

Attention: **Mr. Kam Bhuiyan**

Re: Trinity College School – Exterior Brick Restoration and Interior Improvements Johnson Block

1.1 We, the undersigned, having examined the Bid Documents for the above-named project/contract, including Addendum Number(s) _____, and having visited the Place of the Work, hereby offer to perform the Work in accordance with the Bid Documents, for the stipulated price of:

$_____ in Canadian dollars, excluding Value Added Taxes.

1.2 H.S.T. in the amount of $ _____is not included in the Stipulated Price.

1.3 Our Stipulated Price includes Cash Allowances in the Total Amount of $10,000.00 (Ten Thousand Dollars) as listed in the Instructions to Bidders.

1.4 We, the undersigned, declare that:
.1 we agree to perform the Work within the required completion time specified in the Bid Documents,
.2 we have arrived at this bid without collusion with any competitor,
.3 this bid is open to acceptance by the Owner for a period of 90 days from the date of bid closing, and
.4 all bid form supplements called for by the Bid Documents form an integral part of this bid.

1.5 In the event that work extra to that included in the Contract is required, and is authorized in writing by the Owner, the Contractor shall be allowed a mark-up for overhead and profit calculated as follows:
.1 ten percent (10%) on Work performed by the Contractor's own forces, and
.2 five percent (5%) on Work performed by Subcontractors.

1.6 We have received and included for Addenda No. to in the Stipulated Price.

IDENTIFIED PRICE SCHEDULE

ITEM	DESCRIPTION	BID PRICE
1. Project Initiation & Demolition		
1.1	**General Requirements** – Including bonding, insurance, mobilization, locates, demobilization, approvals, etc.	$
1.2	**Demolition** – Demolition including any necessary removals of existing site materials and interior demolition as per the drawings and specifications.	$
2. Exterior Wall Improvements		
2.1	Masonry Restoration	$
2.2	Supply and install of Scaffold	$
3. Heat Tracing Scope of Work		
3.1	Supply and Installation of new heat trace system	$
4. **Interior Improvements**		
4.1	Gym Roof Reinforcing and New Ceiling Re-work	$

5. Cash Allowances		
4.1	Independent Inspection and Testing.	**$10,000.00**
BID PRICE		**$**

ITEMIZED PRICES NOT INCLUDED IN THE BASE BID

ITEM	DESCRIPTION	ITEMIZED PRICE
6. ITEMIZED PRICING NOT INCLUDED IN BASE BID PRICE		
1.1	Supply and Install Copper Gutters and Downspout in Lieu of Pre-Finished Metal	$

Tender price includes the receiving, handling and (installation of allowance item(s)), including all related supervision, administration, overhead and profit.

1.7 ITEMIZED PRICES

We, the above-named bidder, provide below the requested breakdown of items of Work included in our bid price. It is understood that these itemized prices are provided for information purposes only and will not be used to modify the scope of the Work and adjust our bid price.

1.8 We agree the Owner reserves the right to accept or reject prices bid for the work or for any portion of the work.

1.9 We agree to complete all work including necessary overtime work pursuant to this Contract in the period required to meet the scheduled completion dates.

1.10 We have carefully examined all the Tender Documents, have visited the Site, and have a clear and comprehensive knowledge of the Work required under this Contract and of all the working conditions and schedule requirements.

1.11 We submit the names of subcontractors upon whose tender the stipulated price was based:

Trade	Firm	Address
Mechanical		
Masonry		
Structural Steel		
Electrical		
Scaffolding		

1.12 We the undersigned agree that this Tender is valid and irrevocable and subject to acceptance by the Owner without notice to us for a period of thirty (30) from date of receipt of Tender, and that if notified of award of Contract, we will within ten (10) days of receipt of notification of Acceptance of Tender:

.1 Furnish to the Owner, in care of the Consultant, copies of insurance policies as required by the Conditions of the Contract.

.2 Furnish to the Owners a breakdown of the Stipulated Price in such form and detail as required by the Owner for progress payments, taxation and internal accounting purposes.

.3 Furnish to the Owner, a Performance Bond and a Labour and Material Payment Bond each in an amount equal to 50% of the Stipulated Price to ensure the full and proper completion of the Contract.

.4 Commence the work forthwith after the receipt of a letter of intent, contract or Purchase Order or when notified to do so by the Consultant and/or Owner and to execute the work continuously to completion. Time shall be the essence of the Contract and the work shall be completed in accordance with the schedule outlined in the Instructions to Bidders.

.5 Furnish to the Owner a Clearance Certificate of the Workplace Safety and Insurance Board.

.6 Submit within three (3) days of award of the contract a detailed construction schedule to the Owner for approval.

.7 Furnish to the Owner a copy of our Corporate Safety Policy.

1.13 Wherever the plural is used herein, the same shall be read and construed as if the singular had been used where the facts and context so requires and as if all necessary grammatical changes had been made.

1.14 Signature and Seal of Bidder:

By my signature hereunder, I hereby agree to supply all of the labour, material, equipment and services required to complete the work specified for the **Trinity College School – Exterior Brick Restoration and Interior Improvements Johnson Block Upper Gym** and in accordance with all of the terms and conditions of this tender.

Dated this _____ day of _____, 2023

_____
Name of Company

_____ _____
Street Address Signature of Company Official
(I have the authority to bind the Company)

_____ _____
City or Town Name and Title

_____ _____
Postal Code Signature of Company Official
(I have the authority to bind the Company)

_____ _____
Telephone No. Name and Title

SEAL

_____
Facsimile No.

_____
E-mail Address

_____
H.S.T. Registration No

If the bidding firm is a limited company, the company seal must appear on this Bid Form with the signature(s) of the proper signing official(s).

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Work covered by contract documents
.2 Owner
.3 Location of the site
.4 Scheduling requirements
.5 Site access
.6 Contractor traffic route
.7 Work sequence
.8 Contractor use of premises
.9 References and codes
.10 Engineer design
.11 Hazardous material discovery
.12 Building smoking environment
.13 Special conditions
.14 Site security
.15 “By Others”
.16 Protection of Drawings

1.2 Work Covered by Contract Documents

.1 Work of this Contract comprises the Renovation for the Exterior Brick Restoration and Interior Improvements at Johnson Block Upper Gym, 55 Deblaquire Street North, Port Hope, Ontario for Trinity College, and as indicated on the drawings and specifications.

1.3 Location of Site

.1 The Work of this Contract is located at 55 Deblaquire Street North, Port Hope, Ontario.

1.4 Metric Project

.1 This project is to be based on The International System of Units (SI). Measurements are expressed in imperial.

.2 All dimensions are to be shown in imperial.

1.5 Site Access

.1 Access to the site to be arranged by the Owner.

.2 Provide secure construction fencing as specified and where indicated.

1.6 Contractor Traffic Route

.1 Maintain fire department access/control.

1.7 Work Sequence

.1 Construct Work continuously.

1.8 Contractors Use of Premises

.1 Contractor has unrestricted use of site until Substantial Performance.

1.9 References and Codes

.1 Perform Work in accordance with Ontario Building Code (OBC), National Fire Code of Canada (NFC), the Canadian Electrical Code CSA C22.1-15, and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.

1.10 Engineer Design

.1 Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Ontario to design such work.

1.11 Hazardous Material Discovery

.1 Should any material resembling asbestos or other hazardous substances be encountered in course of demolition work, immediately stop work and notify the Consultant. Refer to Section 01 41 00.

1.12 Building Smoking Environment

.1 Smoking is prohibited in all work places within the Owner’s buildings and on School Board property.

1.13 Special Conditions

.1 The following general and special conditions apply:
.1 All existing surfaces and finishes are to be repaired wherever damaged during the course of the Work.
.2 Wherever existing floor and wall finishes are to be removed, include full removal down to the existing substrate of all materials, tiles, base, mortars, grouts, waterproofing membranes and adhesives. Patch and repair existing substrate to the quality required by the new finish material manufacturer for the installation of their products.
.3 All exposed interior surfaces except prefinished surfaces shall be painted whether referred to in the specifications and drawings or not.
.4 Scaffold loads to be spread across existing low roof and must be complete prior to applied snow loads.

1.14 Site Security

.1 Provide inspection of the building and site daily while the work is in progress and shall take whatever measures are necessary to secure the building from theft, vandalism and unauthorized entry.

1.15 "By Others"

.1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope of work, but will be required to be done within the General Contractor's contract.

1.16 Protection of Drawings

.1 Copyright of electronic document belongs to the Consultant. Electronic documents may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.

.2 Drawings, specifications and other contract related documents which are posted on Contractor controlled websites for access by sub-trades and suppliers, shall be posted only on password protected and secure websites approved by the Consultant to limit access to those with an expressed interest in the Project.

.3 Provide Consultant and owner with access to such websites as noted above.

PART 2 PRODUCTS

3.1 Not Used

.1 Not used

PART 3 EXECUTION

3.2 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requests for Information
.2 Submittal procedures
.3 Screening of RFI's
.4 Response to RFI's
.5 Response Timing

1.2 Related Sections

.1 Section 01 31 00 Project Management and Coordination
.2 Section 01 33 00 Submittal Procedures

1.3 Request for Information (RFI)

.1 A request for information (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents or to obtain additional information.
  .1 An RFI shall not constitute notice of claim for a delay.

1.4 Submittal Procedures

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
  .1 Number RFI's consecutively in one sequence in order submitted, in numbering system as established by the Contractor.

.2 Submit one distinct subject per RFI form. Do not combine unrelated items on one form.

.3 RFI form:
  .1 Submit a draft "Request for Information" form to be approved by the Owner and Consultant.
  .2 Submit RFI's to the Consultant on approved "Request for Information" form. The Consultant shall not respond to an RFI except as submitted on this form.
  .3 Where RFI form does not have sufficient space to provide complete thereon, attach additional sheets as required.
  .4 Submit with RFI form all necessary supporting documentation.

.4 RFI log:
  .1 Maintain log of RFI's sent to and responses received from the Consultant, complete with corresponding dates.
  .2 Submit updated log of RFI's at each construction meeting and with each application for payment submission.

.5 Submit RFI's sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do so will not be paid by the Owner.

.6 Only the Contractor shall submit RFI's to the Consultant.

.7 RFI's submitted by Subcontractors or Suppliers directly to the Consultant will not be accepted.

1.5 Screening of RFI's

.1 Contractor shall satisfy itself that an RFI is warranted by undertaking a thorough review of the Contract Documents to determine that the claim, dispute, or other matters in question relating to the performance of the Work or the Interpretation of the Contract Documents cannot be resolved by direct reference to the Contract Documents. Contractor shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review description, or where the detail provided is, in the opinion of the Consultant, insufficient, shall not be reviewed by the Consultant and shall be rejected.

1.6 Response to RFI's

.1 Consultant shall review RFI's from the Contractor submitted in accordance with this section with the following understandings:
  .1 Consultant's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
  .2 Only the Consultant shall respond to RFI's. Responses to RFI's received from entities other than the Consultant shall not be considered.

1.7 Response Timing

.1 Allow 5 Working Days for review of each RFI by the Consultant.

.2 Consultant's review of RFI commences on date of receipt of RFI submission by the Consultant from Contractor and extends to date RFI returned by Consultant.

.3 When the RFI submission is received by Consultant before noon, review period commences that day. When RFI submittal is received by Consultant after noon, review period begins on the next Working Day.

.4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 5 Working Days, the Consultant will confer with the Contractor within 3 Working Days of receipt of such RFI's, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority among the RFI's submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Preconstruction Conference
.2 Project Meetings
.3 On Site Documents
.4 Schedules
.5 Requests for Information (RFI's)
.6 Closeout Procedures
.7 Cost Breakdown

1.2 Preconstruction Conference

.1 The Consultant will call for and administer Preconstruction Conference at time and place to be announced.

.2 Contractor, all major Subcontractors, and major suppliers shall attend the Preconstruction Conference.

.3 Agenda will include, but not be limited to, the following items.
.1 Lines of communication and contact information
.2 Schedules
.3 Personnel and vehicle permit procedures
.4 Use of premises
.5 Location of any Contractor on-Site facilities
.6 Security
.7 Housekeeping
.8 Submittal and RFI procedures
.9 Inspection and testing procedures, on-Site and off-Site
.10 Control and reference point survey procedures
.11 Health and Safety
.12 Contractor's Schedule of Values
.13 Contractor's Schedule of Submittals

.4 The Consultant will distribute copies of minutes to attendees. Attendees shall have seven (7) days to submit comments or additions to minutes. Minutes will constitute final documentation of results of Preconstruction Conference.

1.3 Project Meetings

.1 The Contractor will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.4 On-Site Documents

.1 Maintain at job site, one copy each of the following:
.1 Contract drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed shop drawings.
.5 Requests for Information (RFI's)
.6 Change orders.
.7 Other modifications to Contract.

.8 Field test reports.
.9 Copy of approved Work schedule.
.10 Manufacturers' installation and application instructions.
.11 Health and Safety Plan and Other Safety Related Documents.
.12 Other documents as specified.

1.5 Schedules

.1 Submit a construction progress schedule to Consultant within 10 working days of the Contract award and at least 10 working days prior to the submission of the first progress claim. The construction progress schedule must show anticipated progress stages and final completion of the work within the time periods required by the Contract documents.

.2 During progress of Work revise and resubmit as directed by Consultant.

.3 The current project schedule shall be tabled at each regular site meeting.

1.6 Requests for Information (RFI's)

.1 Refer to Section 01 26 15 – Requests for Information

1.7 Closeout Procedures

.1 Notify Consultant when Work is considered ready for Substantial Performance.

.2 Accompany Consultant on preliminary inspection to determine items listed for completion or correction.

.3 Comply with Consultant's instructions for correction of items of Work listed in executed certificate of Substantial Performance.

.4 Notify Consultant of instructions for completion of items of Work determined in Consultant's final inspection.

1.8 Cost Breakdown

.1 Submit a detailed cost breakdown to Consultant at least ten (10) working days prior to the submission of the first progress claim. After approval by Consultant the cost breakdown will be used as basis for progress payment.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Submittals
.2 Schedules Required
.3 Format
.4 Submission
.5 Critical Path Scheduling
.6 Submittals Schedule

1.2 Related Sections

.1 Section 01 33 00 Submittal Procedures
.2 Section 01 77 00 Closeout Procedures

1.3 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.4 Schedules Required

.1 Submit schedules as follows:
  .1 Construction Progress Schedule.
  .2 Submittal Schedule for Shop Drawings and Product Data.
  .3 Submittal Schedule for Samples.
  .4 Product Delivery Schedule.
  .5 Cash Allowance Schedule for purchasing Products.
  .6 Shutdown or closure activity.

1.5 Format

.1 Prepare schedule in form of a horizontal bar chart using Microsoft Project 2010 or later.

.2 Provide a separate bar for each major item of work, trade or operation.

.3 Split horizontally for projected and actual performance.

.4 Provide horizontal time scale identifying first work day of each week.

.5 Format for listings: chronological order of start of each item of work.

.6 Identification of listings: By Systems description.

1.6 Submission

.1 Submit initial format of schedules within 15 working days after award of Contract.

.2 Submit schedules in electronic format, by email as PDF files.

.3 Consultant will review schedule and return review copy within 10 days after receipt.

.4 Resubmit finalized schedule within 7 days after return of review copy.

.5 Submit revised progress schedule with each application for payment.

.6 Distribute copies of revised schedule to:
- .1 Job site office.
- .2 Subcontractors.
- .3 Other concerned parties.
- .4 Instruct recipients to report to Contractor within 10 days, any problems anticipated by timetable shown in schedule.

.7 Table current and up to date schedule at each regular site meeting.

1.7 Critical Patch Scheduling

.1 Include complete sequence of construction activities.

.2 Schedules shall represent a practical plan to complete the work within the Contract period, and shall convey the plan to execute the work. Schedules as developed shall show the sequence and interdependencies of activities required for complete performance of the work.

.3 The submittal of schedules shall be understood to be the Contractor's representation that the schedule meets the requirements of the Contract Documents and that the work will be executed in the sequence and duration indicated in the schedule.

.4 Failure to include any element of work required for performance of the Contract or failure to properly sequence the work shall not excuse the Contractor from completing all work within the Contract Time.

.5 All schedules shall be developed utilizing industry standard 'best practices' including, but not limited to:
- .1 No open-ended activities.
- .2 No use of constraints other than those defined in the Contract Documents without the prior approval of the Consultant.
- .3 No negative leads or lags.
- .4 No excessive leads or lags without prior justification and approval from the Consultant.
- .5 For individual schedule construction activities, do not exceed 14 days in duration without prior approval of the Consultant. Subdivide activities exceeding 14 days in duration to an appropriate level.
- .6 Sufficiently describe schedule activities to include what is to be accomplished in each work area. Express activity durations in whole days. Clearly define work that is to be performed by subcontract.
- .7 Create the schedule in conformance with the work-hours and constraints set forth in these Contract Documents.

.6 Include dates for commencement and completion of each major element of construction as follows.
- .1 Site clearing.
- .2 Site utilities.
- .3 Foundation Work.
- .4 Structural framing.

.5 Special Subcontractor Work.
.6 Equipment Installations.
.7 Finishes.

.7 Show projected percentage of completion of each item as of first day of month.

.8 Indicate progress of each activity to date of submission schedule.

.9 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.

.10 Provide a narrative report to define:
.1 Problem areas, anticipated delays, and impact on schedule.
.2 Corrective action recommended and its effect.
.3 Effect of changes on schedules of other prime contractors.

1.8 Submittals Schedule

.1 Include schedule for submitting shop drawings, product data, and samples. Indicate manufacture and delivery lead times into the shop drawing submittal schedule.

.2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Administrative
.2 Requests for Information (RFI's)
.3 Shop Drawings and Product Data
.4 Interference Drawings
.5 Progress Photographs
.6 Samples
.7 Mock-Ups
.8 Certificates and Transcripts

1.2 Related Sections

.1 Section 01 26 15 Requests for Information
.2 Section 01 31 00 Project Management and Coordination

1.3 Administrative

.1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in Imperial units.

.4 Where items or information is not produced in Imperial units converted values are acceptable.

.5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Consultant in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent work are coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's review.

.10 Keep one reviewed copy of each submission on site.

1.4 Requests for Information (RFI's)

.1 Refer to Section 01 26 15 – Requests for Information

1.5 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 to illustrate details of a portion of Work.

.2 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in the Province of Ontario where required by the individual specification sections. Each submittal and each resubmittal must bear the stamp of the Engineer

.4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.5 Allow ten (10) days for Consultant's review of each submission.

.6 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.7 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.

.8 Accompany submissions with transmittal letter containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.9 Submissions shall include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.10 After Consultant's review, distribute copies.

.11 Submit 3 prints plus one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

.12 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.

.13 Delete information not applicable to project.

.14 Supplement standard information to provide details applicable to project.

.15 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.16 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.6 Interference Drawings

.1 Prepare interference drawings to coordinate the installation of the work of all sections, within available space. Conflicts between trades which could be determined beforehand, by the careful coordination and preparation of interference drawings, shall be corrected at no expense to the Owner.

.2 Prepare interference drawings of all buried services as necessary to avoid conflicts with new or existing structures, foundations or services.

.3 Submit interference and equipment placing drawings as specified in Section 01 71 00, when requested by the Consultant.

1.7 Progress Photographs

.1 Progress photograph to be electronically formatted and labelled as to location and view.

1.8 Samples

.1 Submit for review samples as requested in respective specification Sections. Label samples with origin, manufacturer, product information, applicable specification section, and intended use.

.2 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.3 Where colour, pattern or texture is criterion, submit full range of manufacturer's samples.

.4 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.5 Make changes in samples which Consultant may require, consistent with Contract Documents.

.6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.9 Mock-Ups

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.10 Certificates and Transcripts

.1 Submit Workers' Compensation Board status.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Administrative
.2 Fires
.3 Disposal of Wastes
.4 Drainage
.5 Site Clearing and Plant Protection
.6 Pollution Control
.7 Unanticipated Soil Contamination

1.2 Related Sections

.1 Section 01 41 00 Regulatory Requirements
.2 Section 01 51 00 Temporary Utilities
.3 Section 01 56 00 Temporary Barriers and Enclosures

1.3 References

.1 Statutes of Canada 1999 Chapter 33. Canadian Environmental Protection Act 1999.
.1 SOR/2003-289. Federal Halocarbon Regulations, 2003.
.2 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
.2 OPSS 805 “Construction Specification for Temporary Erosion and Sediment Control Measures”.

1.4 Administrative

.1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation, including those referenced above.

.2 The Work Site is subject to inspection by the Consultant, without prior notice.

.3 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.

.4 It is the Contractor’s responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.

.5 It is the Contractor’s responsibility to obtain and abide by permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction.

.6 All hazardous materials are to be stored with secondary containment

1.5 Fires

.1 Fires and burning of rubbish on site not permitted.

1.6 Disposal of Wastes

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.7 Drainage

.1 Do not pump water containing deleterious substances into waterways, sewer or drainage systems.

.2 Protect storm drains against entry by sediment, debris, oil, or chemicals.

.3 Control disposal or runoff of water containing deleterious substances or other harmful substances in accordance with local authority requirements.

1.8 Pollution Control

.1 Take all measures necessary to prevent material and mud tracking in existing buildings.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requirements for quality of work.
.2 Requirements for material inspection and testing.
.3 Requirements for determination of defective materials and work.

1.2 Related Work

.1 Section 01 45 00 Quality Control

1.3 References

.1 CSA A23.1 Concrete Materials and Methods of Concrete Construction.
.2 CSA A23.2 Methods of Test for Concrete.
.3 CSA S16.1 Limit States Design of Steel Structures.
.4 CSA S304.1-04 (R2010) - Design of Masonry Structures
.5 CSA W47.1 Certification of Companies for Fusion Welding of Steel Structures.
.6 CSA W59 Welded Steel Construction (Metal Arc Welding).
.7 CISC Code of Standard Practice for Structural Steel.
.8 OPSS Ontario Provincial Standard Specifications.

1.4 Regulatory Requirements

.1 Products and services provided to complete the Work shall meet or exceed requirements of specified standards, municipal by-laws, building codes and referenced documents.

1.5 Independent Inspection and Testing

.1 Independent Inspection and Testing Consultants will be engaged on behalf of the Owner, for the purpose of inspecting and/or testing individual portions of the Work. The initial cost of such services will be included in the Contract Price, as allocated under Section 01 21 00, Allowances.

1.6 Responsibilities

.1 Inspection and Testing Consultants
  .1 Inspection and Testing Consultants shall;
    .1 Provide inspection and testing specified,
    .2 Inform the Contractor and Consultant immediately upon observance of materials, systems, or procedures not in compliance with the specifications, and
    .3 Submit complete reports to the Contractor and the Consultant in a timely manner.

.2 Contractor
  .1 Contractor shall:
    .1 Ensure the quality control requirements of the Contract are implemented.
    .2 Provide access to the Work for Inspection/Testing Consultants, and
    .3 Inform the Inspection/Testing Consultants in advance of day and time required for inspection and tests.

.3 Consultant
.1 The Consultant will make final decisions on changes to the scope of work of inspection and testing that may affect the Contract Price.
.2 When informed of any material procedure or test result that does not meet or exceed the specifications, the Consultant will respond in an expedient manner to resolve the issue.

1.7 Access to Work

.1 Allow inspection & testing company's access to the Work, as well as off-site manufacturing and fabrication plants.

1.8 Work Subject to Inspection and Testing

.1 Refer to individual specification sections for requirements for inspection and testing.

.2 Provide additional inspection and testing beyond that listed in the specifications where directed by the Consultant.

1.9 Reports

.1 Submit inspection and test reports to the Consultant.

.2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

.3 Submit one copy of inspection and test reports to the Building Official having jurisdiction, where required by that official.

.4 The cost of tests 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 Ups

.1 Refer to Section 01 45 00 – Quality Control.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Inspection and Testing – General

.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.

3.2 Inspection and Testing – Procedures

.1 Notify the appropriate agency and Consultant 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, cure and inspect test samples.

3.3 Quality of Work

.1 Quality of the Work shall be first class, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required work is such as to make it impractical to produce required results.

.2 Do not employ any unfit person or anyone unskilled in their required duties. The Consultant reserves the right to require the dismissal from the site, of workers deemed incompetent, careless, insubordinate or otherwise objectionable.

3.4 Defective Materials and Work

.1 Where evidence exists that defective work has occurred, or that work has been carried out incorporating defective products, the Consultant may have independent tests, inspections, or surveys performed in order to determine if work is defective.

.2 Tests, inspections, or surveys carried out under these circumstances will be made at the Contractor's expense in the event of defective work, or at the Owner's expense where work is in conformance. Where tests incorporate a number of samples, payment will be assessed, by the Consultant, based on the ratio of conforming to non-conforming results. This does not include re-testing of soil compaction during placement, where evidence exists of non-conformance with the Contract documents, but rather only if re-testing is called for after completion of compaction.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 References.
.2 Owner's Regulations.
.3 Standards and Definitions.
.4 Designated Substances.
.5 Hazardous Materials.
.6 Spills Reporting.
.7 Protection of Water Quality.
.8 Potable Water Systems.
.9 Access for Inspection and Testing.
.10 Other Regulatory Requirements.

1.2 Related Sections

.1 Section 01 70 03 Safety Requirements

1.3 References

.1 Perform Work in accordance with the Ontario Building Code Act, O. Reg. 332/12, the Ontario Building Code (OBC) including all Supplements and other codes of provincial or local regulation provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Where a material is designated in the Contract Documents for a certain application, unless otherwise specified, that material shall conform to standards designated in the Code. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned Code.

.3 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.
.3 Manufacturer's instructions.

.4 Where requirements of Contract Documents exceed Code requirements provide such additional requirements.

.5 Where the Building Code or the Contract Documents do not provide all information necessary for complete installation of an item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

1.4 Owner's Regulations

.1 Conform to requirements, regulations and procedures of the Owner.

1.5 Standards and Definitions

.1 Where a reference is made to specification standards produced by various organizations, conform to latest edition of standards, as amended and revised to date of Contract.

.2 Have a copy of each specified standard which relates to your work available on the site to be produced immediately on Consultant's request.

.3 Where a standard designates authorities such as the "Engineer", the "Owner" (when used in a sense other than that defined in the General Conditions) the "Purchaser" or some other such designation, these designations shall be taken to mean the Consultant.

.4 Wherever the words "acceptable", "approved", "satisfactory", "selected", "directed", “inspected”, “instructed”, “required”, "submit", or similar words or phrases are used in standards or elsewhere in the Contract Documents, it shall be understood that they mean, unless the context provides otherwise, "acceptable to the Consultant", "approved by the Consultant", "satisfactory to the Consultant", "selected by the Consultant", "directed by the Consultant", "inspected by the Consultant", "instructed by the Consultant", "required by the Consultant" and "submit to the Consultant".

1.6 Designated Substances

.1 Known designated substances are identified in the Designated Substance Report.

.2 Stop work immediately when material resembling asbestos, mould or any other designated substance which is not identified in the Designated Substance Report is encountered during the course of the work. Notify Owner and Consultant immediately.

.3 The Owner will arrange for independent testing of suspected designated substances and removal of such substances encountered on the site during the course of the work which are not identified in the Designated Substance Report.

1.7 Hazardous Materials

.1 Definition: "Hazardous Material" is material, in any form, which by its nature, may be flammable, explosive, irritating, corrosive, poisonous, or may react violently with other materials, if used, handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.

.2 Hazardous Materials will not be introduced for experimental or any other use prior to being evaluated for hazards.

.3 Make known to the Consultant those hazardous materials or designated substances intended to be used in the workplace and receive permission to use before introducing to the Owner’s property.

.4 Provide MSDS for all materials brought to the Place of Work.

.5 Many common construction materials such as asbestos pipe and various insulations are designated substances and shall not be used under any circumstances. Such materials are banned from the Owner’s facilities.

1.8 Spills Reporting

.1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Consultant. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1999.

.2 All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.

.3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

1.9 Protection of Water Quality

.1 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geo-textile coverage will be required.

.2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the watercourses.

.3 Provide all de-watering and sedimentation control required to properly complete the work of this contract.

.4 Supply, install and maintain silt/sediment control fencing along the edge of the site to intercept construction runoff silt, to the satisfaction of the Owner.

1.10 Potable Water Systems

.1 Potable water systems in completed buildings must meet criteria and guidelines established by Provincial and Municipal authorities, prior to occupancy by the Owner.

.2 Upon completion, submit testing certificates verifying water quality and water systems meets all applicable Provincial and Legislated Standards

1.11 Access for Inspection and Testing

.1 Cooperate fully with and provide assistance to, all outside authorities including Building Inspectors, utilities, testing agencies and consultants, with the inspection of the Work.

1.12 Other Regulatory Requirements

.1 Conform to the requirements of the Ontario Ministry of Transportation, Regional and Local authorities regarding transportation of materials.

.2 Obtain required road occupancy permits.

.3 Pay any required roadway damage deposits required by the local municipality.

.4 Conform to the requirements of the Ontario Ministry of the Environment.

.5 Conform to the requirements of the Ontario Ministry of Labour.

.6 Conform to the requirements of the local Conservation Authority.

.7 Conform to all applicable local by-laws, regulations and ordinances.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Installation and Removal
.2 Dewatering
.3 Water Supply
.4 Temporary Heating and Ventilation
.5 Temporary Power and Light
.6 Temporary Communication Facilities

1.2 Related Sections

.1 Section 01 52 00 Construction Facilities.
.2 Section 01 56 00 Temporary Barriers and Enclosures

1.3 Installation and Removal

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.4 Water Supply

USE WHERE WATER IS AVAILABLE (EXISTING BUILDINGS)

.1 Existing sources of water can be made available to the Contractor at no charge, subject to operational requirements. Arrange for connection and pay all costs for installation, maintenance and removal. Conversions or alterations to existing sources of water to meet construction requirements are the responsibility of the Contractor.

.2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

1.5 Temporary Heating and Ventilation

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted, unless prior approval is given by the Consultant.

.3 Provide temporary heat and ventilation in enclosed areas as required to:
  .1 Facilitate progress of Work.
  .2 Protect Work and products against dampness and cold.
  .3 Prevent moisture condensation on surfaces.
  .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  .5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10^{o} C in areas where construction is in progress.

.5 Ventilating:
.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
.4 Ventilate storage spaces containing hazardous or volatile materials.
.5 Ventilate temporary sanitary facilities.
.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Permanent heating system of building, may not be used when available, unless there are savings to the contract price and Consultant's written permission is obtained stating conditions of use, provisions relating to guarantees on equipment and operation and maintenance of system. Be responsible for damage to heating system if use is permitted.

.7 On completion of Work for which permanent heating system is used, replace filters.

.8 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.

.9 Pay costs for maintaining temporary heat, when using permanent heating system. Owner will pay utility charges when temporary heat source is existing building equipment.

.10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
.1 Conform to applicable codes and standards.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes.
.5 Vent direct fired combustion units to outside.
.11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 Temporary Power and Light

.1 Existing sources of electric power can be made available to the Contractor. Conversions or alterations to existing sources of electric power to meet construction requirements are the responsibility of the Contractor.

.2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

.3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected.

1.7 Temporary Communication Facilities

.1 Provide and pay for temporary telephone, fax, data hook up, lines and equipment necessary for own use.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Construction aids.
.2 Site storage.
.3 Parking
.4 Offices
.5 Equipment and Material Storage.
.6 Sanitary facilities.
.7 Signage.
.8 Hoarding
.9 Shoring

1.2 References

.1 Canadian Standards Association (CSA International)
  .1 CAN/CSA Z321-96 (R2006), Signs and Symbols for the Workplace

1.3 Installation and Removal

.1 Provide construction facilities in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.4 Scaffolding

.1 Provide and maintain scaffolding, ramps, ladders and platforms.

1.5 Hoisting

.1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists and cranes shall be operated by qualified operator.

1.6 Site Storage/Loading

.1 Do not unreasonably encumber premises with products.

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

1.7 Construction Parking

.1 Parking will be permitted on site at areas designated by the Owner provided it does not disrupt performance of Work or ongoing Owners operations.

.2 Provide and maintain adequate access to project site.

.3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.8 Offices

.1 General Contractor and Subcontractors may provide their own offices as necessary and subject to site constraints. Direct location of these offices.

1.9 Equipment, Tool and Material Storage

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.10 Sanitary Facilities

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.11 Construction Signage

.1 Direct requests for approval to erect a Contractor signboard to Consultant.

.2 Signs and notices for safety and instruction shall be in English. Graphic symbols shall conform to CAN/CSA Z321-96 (R2006).

.3 Post "Construction Zone" signage outside barrier and entrance to all work areas.

.4 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project.

.5 Install signage to direct site traffic and deliveries to the Construction work areas.

1.12 Shoring

.1 Examine the site to determine the conditions under which work will be performed.

.2 Contractor shall formulate his own conclusions as to the extent of the existing conditions and shoring required.

.3 The method of shoring shall be according to the Contractor's and his Engineer's directions.

.4 All existing loads must be shored prior to commencement of demolition and removal of load bearing elements.

.5 All shoring and frame braces must be supplied with a safe load rating which must not be exceeded. Install in accordance with manufacturer's recommended procedures and safety guidelines. Ensure that the safe load conditions of the shoring are not exceeded by dead, live or construction loads.

.6 All shoring shall be subject to the Consultant's review and approval prior to commencing demolition work.

.7 Completely remove all shoring after new structure is installed and all concrete is set.

.8 Submit shoring drawings and a proposed installation procedure stamped by a professional engineer registered in the Province of Ontario. Procedures shall follow the information provided on these drawings. The shoring design engineer shall be retained and paid for by the Contractor. The shoring engineer shall review all existing conditions on site prior to completing shoring design.

.9 Removal of existing materials without proper engineered shoring is a safety hazard and will not be permitted.

.10 Make good all damage to the existing structure and adjoining structures and bear full responsibility for failure to provide adequate shoring.

.11 The failure or refusal of the Consultant to suggest the use of shoring, shall not in any way or to any extent relieve the Contractor of any responsibility concerning the condition of the work or of any of their obligations under the Contract, nor impose any liability on the Owner or their agents; nor shall any delay, whether caused by any action or want of action on the part of the Contractor, or by any act of the Owner, or their agents, or employees, relieve the Contractor from necessity of properly and adequately protecting the existing structure from collapse or damage, nor from and of his obligations under the Contract relating to injury to persons or property, nor entitle him to any claims for extra compensation or an extension in schedule.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requirements for temporary scaffolding.

1.2 Related Sections

.1 Section 01 33 00 Submittal Procedures.
.2 Section 01 52 00 Construction Facilities.

1.3 References

.1 ASTM International (ASTM):
  .1 ASTM G154-12a Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
.2 Canadian General Standards Board (CGSB):
  .1 CAN /CGSB -4.2 Textile Test Methods:
    .1 9.2-M 90(R2004), Breaking Strength of Fabrics - Grab Method - Constant-time-to-break Principle.
    .2 9.4-M 91(R 2004), Breaking Strength of Yarns - Single Strand Method.
    .3 11.1-94(R 2000), Bursting Strength - Diaphragm Pressure Test.
.3 Underwriters Laboratories of Canada (ULC).
  .1 CAN/U LC -S109-03, Flame Tests of Flame-Resistant Fabrics and Films.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
.2 Scaffolding Drawings:
  .1 Submit drawings of each proposed temporary scaffolding assembly. Do not commence work on site until drawings have been reviewed and accepted by the Consultant.
  .2 Indicate the general layout of the scaffolding, materials, profiles, and details of connections.
  .3 Include exact locations of attachments to the existing buildings and complete details of methods of attachment.
  .4 Temporary scaffolding, including all related connections and fastenings, shall be designed by a structural engineer licensed to practice in the Province of Ontario. Each scaffolding drawing submitted shall bear the stamp and signature of the aforesaid structural engineer.
.3 If requested by the Consultant, submit engineering calculations.

.4 Samples: Submit a sample of each of the following:
  .1 300 mm long sample of each profile of scaffolding framing.
  .2 Sample of each type of connector.
  .3 Sample of each type of attachment to the building structure.
  .4 Minim um 200 mm x 200 mm sample of scaffold netting.

.5 Post-Installation Certification: After the installation of each scaffolding assembly, provide written certification, signed by the Structural Engineer responsible for the scaffolding design, that all item s have been properly installed in accordance with the scaffolding drawings and that the scaffolding assembly is compliant with governing regulations.

1.5 Design Responsibility

.1 Notwithstanding the requirements specified herein, the Contractor is responsible for the design and construction of temporary scaffolding and associated ladders, hoists, netting, cold weather enclosures and related items.

1.6 Regulatory Requirements

.1 The design and construction of the temporary scaffolding shall comply with all applicable municipal, provincial and federal safety regulations.

.2 Make required submittals to the authorities having jurisdiction and obtain necessary approvals and permits.

1.7 Quality Assurance

.1

1.8 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Scaffolding

.1 Provide a demountable temporary metal scaffolding system, complete with all accessories, with the following characteristics:
  .1 Construct scaffolding from corrosion-resistant materials such as galvanized or stainless steel or aluminum.
  .2 Design the scaffolding assemblies to carry design loads, including wind loads imposed by the wind resistance of the netting.
  .3 Design and construct each scaffolding assembly so that it derives no vertical support from the building and requires minim um attachment to the building fabric.
  .4 Devices for attachment to the building fabric shall be fabricated from stainless steel and shall be reviewed and accepted by the Consultant prior to installation.
  .5 Generally, scaffolding shall consist of two rows of standards (vertical supports, connected by ledgers and transom s (horizontal elements)). Standards shall sit on timber sole plates to distribute the imposed loads and to protect the ground surfaces. If telescopic standards are used they shall be plumb and properly founded. Use only the manufacturer's high tensile steel pins for support.
  .6 Equip scaffolding with sufficient platform s to provide complete access to the building facade without having to move platforms up or down.
  .7 Platform s shall be undamaged and shall not become slippery when wet. Remove and replace boards which are dam aged and/or become slippery.
  .8 Provide an effective means to hold down platform boards in high winds.

.9 If masonry units or other heavy localized loads are to be carried on a platform during the course of the work, design the supporting scaffolding framing and the platform for the loads to be supported.
.10 Design and construct attachments to the building to minimize dam age to the building fabric. Fabricate all attachments from stainless steel.
.11 Design and erect scaffolding so that the building fabric is not dam aged when minor movement occurs under loading conditions. Provide all tube ends within 25 mm of the wall surface with plastic end caps

2.2 Scaffold Enclosure

.1 Netting:
.1 High strength, high density polyethylene (HDPE) mesh with a stretching weave, containing flam e retardant and ultra-violet stabilizers, colour clear (transparent).
.2 Webbing at edges with eyelets at 100 mm o.c.
.3 Properties:
.1 Mesh Diameter: 3.2 mm.
.2 Weight: 270 g/m^2.
.3 Drop test: 25 kg weight dropped into middle of 3660 mm x 7620 mm panel: No damage.
.4 Mesh breaking strength: (CAN/CG SB-4.2 Method 9.2): Length: 114.6 kg Width: 78.5 kg
.5 Elongation at break: Length: 51%; Width: 141%
.6 Yarn breaking strength (CAN/CG SB-4.2 Method 9.4): 7.26 kg
.7 Burst strength: (CAN /CG SB-4.2 Method 11.1): 2689 kPa
.8 Wounded Burst strength: (C AN/C G SB-4.2 Method 11.1): 627.4 kPa
.9 Operating temperature range: -40oC to
.10 U V resistance (AST M G 154): +>490o%C.
.11 Flame resistance (C AN /U LC -S109): Complies

.2 Fastenings:
.1 Sealant tape for joining rolls and securing to a surface: As recommended by netting manufacturer.
.2 Cable ties: U V resistant, zip-action, 280 mm long, clear colour to match netting.
.3 Toggle ties: Elasticated, 205 mm to 460 mm stretch.
.4 Tie cord: 12 mm dia x 220 m long coils.

PART 3 EXECUTION

3.1 Examination and Preparation

.1 Examine areas and conditions under which each scaffold is to be erected and notify the Consultant in writing of conditions detrimental to a proper scaffolding assembly.

.2 Verify that the ground surface provides adequate support for the scaffold structure.

.3 Examine the building at each point of attachment of the scaffold and verify the adequacy of the building fabric to accept the fastener with minim al dam age and to withstand the in-service loads imposed by the scaffold.

.4 Do not proceed with the work until unsatisfactory conditions have been corrected to the satisfaction of the installer.

.5 Obtain the Consultant's written approval of the locations and methods of attachment to the existing building fabric prior to the erection of each scaffold.

.6 Commencement of the erection of scaffolding will be construed as acceptance of the site conditions and, thereafter, the Contractor shall be fully responsible for dam age to the existing building fabric and shall make good any such dam age to the satisfaction of the Consultant and at no additional cost to the Contract.

3.2 Scaffold Erection

.1 Erect each scaffold in accordance with the reviewed and accepted scaffolding drawings and in conformity with applicable construction safety regulations.

.2 Install netting.
- .1 Do not attempt to install netting in windy conditions.
- .2 Tie netting to scaffold frame at the frequency indicated on the scaffolding drawings and recommended by the netting manufacturer.
- .3 At adjacent roll edges, overlap webbing and pass ties through both eyelets.

3.3 Inspections

.1 After the erection of each scaffold, have the engineer responsible for the scaffold design con duct a site inspection and issue the specified post-installation certification. Make any adjustments required by the scaffolding engineer and/or the authorities having jurisdiction.

.2 Conduct weekly inspections of each scaffold to verify netting remains firmly tied and scaffold frame, platform s and accessories remain in proper condition. Replace broken ties and torn netting. Adjust, repair or replace defective platform components, framing m embers, con ne c tors and accessories to the satisfaction of the scaffolding engineer and/or the authorities having jurisdiction.

3.4 Scaffold Removal

.1 Deconstruct and remove each scaffold as soon as it is no longer required for the execution of the work and after review and acceptance of the work by the Consultant.

.2 Make good dam age to the building fabric at the points of attachment and restore ground surfaces to a condition at least equal to that which existed prior to commencement of the work.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Barriers.
.2 Environmental Controls.
.3 Traffic Controls.
.4 Fire Routes.

1.2 Installation and Removal

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 Hoarding

.1 Erect temporary site enclosure using new solid plywood hoarding, minimum 1.8 metres high. Provide gates as necessary. Maintain hoarding in good repair.

1.4 Guard Rails and Barricades

.1 Provide secure, rigid guard rails and barricades around open shafts, open stair wells and open edges of floors.

.2 Provide as required by governing authorities.

1.5 Dust Tight Screens

.1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.6 Access to Site

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

1.7 Public Traffic Flow

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

1.8 Fire Routes

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

1.9 Protection for Off Site and Public Property

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred

1.10 Protection of Building Finishes

.1 Provide protection for existing finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Consultant locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Product quality, availability, storage, handling, protection, and transportation.
.2 Manufacturer's instructions.
.3 Quality of Work, coordination and fastenings.
.4 Existing Utilities

1.2 Quality

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.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.

1.3 Availability

.1 Review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 Storage, Handling and Protection

.1 Handle and store products in 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 seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 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 and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in 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 satisfaction of Consultant.

.9 Touch up damaged factory finished surfaces to Consultant's satisfaction. Use touch up materials to match original. Do not paint over name plates.

1.5 Transportation

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor shall be responsible for the unloading, handling and storage of such products.

1.6 Manufacturer’s Instructions

.1 Unless otherwise indicated in specifications, 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 Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re installation at no increase in Contract Price or Contract Time.

1.7 Quality of Work

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.

.2 Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

.3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.

.4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.8 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.

1.9 Concealment

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.10 Remedial Work

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 Location of Fixtures

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Consultant of conflicting installation. Install as directed.

1.12 Fastenings

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 Fastenings – Equipment

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 Protection of Work in Progress

.1 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 Consultant, at no increase in Contract Price or Contract Time.

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

1.15 Existing Utilities

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

1.16 Hazardous Materials

.1 Report any found or suspected hazardous materials to the Owner.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Safety Requirements
.2 Fire Protection
.3 Accident Reporting
.4 Records on Site

1.2 References

.1 Federal regulations, latest edition including all amendments up to project date:
  .1 Fire Commissioners of Canada, FC 301, Standard for Construction Operations.
  .2 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
.2 Provincial regulations, latest edition including all amendments up to project date:
  .1 Ontario Building Code.
  .2 Occupational Health and Safety Act.
.3 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition

1.3 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit to Owner and Consultant copies of the following documents, including updates issued:
  .1 Notice of Project filed with Provincial Ministry of Labour or equivalent for Place of Work
  .2 Site-specific Health and Safety Plan prior to commencement of work on the work site. Plan shall include but not be limited to the following:
    .1 Name and contact info of Contractor's Health and Safety Representative for Work Site; including twenty-four (24) hour emergency contact phone numbers.
    .2 Phone numbers of local fire, police, and ambulance outside of 911 services.
    .3 Location of nearest medical facility and level of injury that each can service.
  .3 Submit to the Owner, Consultant and Municipal Fire Department, for review, a “Fire Safety Plan” conforming to Section 2.14 of the National Fire Code of Canada. Maintain a copy of the “Fire Safety Plan” on site.
  .4 Copies of certification for all employees on site of applicable safety training including, but not limited to:
    .1 WHIMIS.
    .2 Fall arrest and protection.
    .3 Suspended Access Equipment.
    .4 Erection of Scaffolding.
    .5 License for powder actuated devices.
  .5 Material Safety Data Sheets (MSDS) of controlled products to be used.
  .6 On-site Contingency and Emergency Response Plan addressing:
    .1 Standard procedures to be implemented during emergency situations.
    .2 Preventative planning and protocols to address possible emergency situations.
.3 Guidelines for handling, storing, and disposing of hazardous materials that maybe encountered on site, including measures to prevent damage or injury in case of an accidental spill.
.4 Incident and accident reports, promptly if and upon occurrence
  .1 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
  .2 Accident or Incident Reports, within 24 hours of occurrence.

.5 Submit other data, information and documentation upon request by the Consultant as stipulated elsewhere in this section.

1.4 Compliance Requirements

.1 Comply with the latest edition of the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act.

1.5 Constructor

.1 The Contractor will be the “Constructor” as defined by the Occupational Health and Safety Act, will file a Notice of Project with the Ontario Ministry of Labour prior to commencement of the work and will pay all associated fees.

.2 The “Constructor” will be solely responsible for the safety of all persons on the Site.

1.6 Safety Requirements

.1 Observe and enforce all construction safety measures and comply with the latest edition and amending regulations of the following documents and in the event of any differences among those provisions, the most stringent shall apply:
- .1 Occupational Health and Safety Act and Regulations for Construction Projects, August 1997, Ontario Regulation 213/91 including amendments.
- .2 Hazardous Products Act and Canada Labour Code.
- .3 The Workplace Safety and Insurance Board, O-Reg 454.
- .4 Ontario Building Code Act, Ontario Regulation 332/12 including amendments.
- .5 National Building Code of Canada, Part 8: Safety Measures on Construction and Demolition Sites.
- .6 National Fire Code of Canada.
- .7 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition
- .8 Environmental Protection Act.
- .9 The Power Commission Act.
- .10 The Boiler and Pressure Vessels Act.
- .11 The Elevators and Lifts Act.
- .12 The Operating Engineer's Act.
- .13 Municipal statutes.

.2 Obey all Federal, Provincial and Municipal Laws, Acts, Statutes, Regulations, Ordinances and By-laws which could in any way, pertain to the work outlined in the Contract, or to any employees of the Contractor. Satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a Contractor, and Constructor and/or Employer with respect to or arising out of the performance of the Contractors obligations under this Contract.

.3 Confined Space: Where applicable, provide the Consultant and all Regulatory Authorities with a copy of the Contractors’ Confined Space Entry Procedure. In the event that defined procedures are not available, abide by the applicable requirements of the Occupational Health and Safety Act and all regulations made thereunder.

.4 The supervisor of the project, will be responsible for his employees and subcontractors/suppliers maintaining standard safety practices, as well as the specific safety rules listed below, while working on the Owner’s property.

.5 The Owner reserves the right to order individuals to leave the site if the individual is in violation of any safety requirement or any Act, and any expense incurred will be the responsibility of the Contractor.

.6 Notify the Owner should any hazardous condition become apparent.

.7 Enforce the use of CSA approved hard hats and safety boots for all persons entering or working at the construction site. Refuse admission to those refusing to conform to this requirement.

.8 Provide safeguard and protection against accident or injury to any person on the site, adjacent work areas and adjacent property.

.9 Provide safeguard and protection against damage to adjacent structures, properties and services.

1.7 Safety Meetings

.1 Site toolbox safety meetings will be held weekly for all Contractor employees and all sub trade contractors.

.2 Where a Joint Health and Safety Committee(s) is required on a project, workers and supervisors, selected, as members of the committee must attend.

1.8 Workplace Hazardous Materials Information System (WHMIS)

.1 Contractor to be familiar with WHIMIS regulations and be responsible for compliance.

.2 Contractor is responsible for all other requirements of regulations as applicable to Employers.

.3 All controlled products to be properly labelled and stored.

.4 Immediately inform Owner and Consultant if any unforeseen or peculiar safety-related factor, hazard, or condition becomes evident during performance of Work.

1.9 Fire Protection

.1 Provide and maintain safeguard and protection against fire in accordance with current fire codes and regulations.

.2 Provide temporary fire protection throughout the course of construction. Particular attention shall be paid to the elimination of fire hazards.

.3 Comply with the requirements of FCC No. 301 Standards for Construction Operations issued by the Fire Commissioner of Canada and the National Building Code.

.4 Provide and maintain portable fire extinguishers during construction, in accordance with Part 6 of the National Fire Code of Canada and NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition

.5 Maintain unobstructed access for firefighting at all areas in accordance with the National Building Code of Canada.

1.10 Accident Reporting

.1 Investigate and report incidents and accidents as required by Occupational Safety and Health Act, and the Regulations made pursuant to the Act.

.2 For the purpose of this contract immediately investigate and provide a report to the Consultant on incidents and accidents that involve:
- .1 A resulting injury that may or may not require medical aid but involves lost time at work by the injured person(s).
- .2 Exposure to toxic chemicals or substances.
- .3 Property damage.
- .4 Interruption to adjacent and/or integral infrastructure operations with potential loss implications.

1.11 Records on Site

.1 Maintain on site a copy of the safety documentation as specified in this section and any other safety related reports and documents issued to or received from the authorities having jurisdiction.

.2 Upon request, make copies available to the Consultant.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Survey services to establish and confirm inverts for Work.
.2 Recording of subsurface conditions found.

1.2 Qualifications of Surveyor

.1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

1.3 Survey Reference Points

.1 Existing control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Consultant.

.4 Report to Consultant when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

1.4 Existing Services

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings. The Contractor is responsible for coordination of all utility locates.

.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut off points as directed by Consultant.

.3 Where Work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to building occupants, pedestrian and vehicular traffic.

.4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

.5 Install temporary drain plugs to prevent construction debris from blocking pipes downstream of the work.

1.5 Location of Services, Equipment and Fixtures

.1 Location of services, equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance. Include existing equipment which affects, or will be affected by the work.

.3 Inform Consultant of impending installation and obtain approval for actual location.

.4 Location of site services where required, is approximate and is based on information provided by the Owner. Undertake all locates to determine exact locations of existing services, and lay out new services to avoid any conflicts with new building elements, including site improvements, building foundations and other new or existing services.

.5 Submit field drawings and interference drawings to indicate relative position of various services and equipment. Refer to requirements for interference drawings specified elsewhere.

.6 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.

.7 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus and connections are coordinated.

.8 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance and access are indicated and maintained.

.9 Submit two (2) copies of interference drawings to Owner and Consultant in accordance with Section 01 33 00.

1.6 Records

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 Record locations of maintained, re-routed and abandoned service lines.

1.7 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.8 Subsurface Conditions

.1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requirements and limitations for cutting and patching the Work.

1.2 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit written request and obtain Consultant's approval in advance of cutting or alteration which affects:
.1 Structural integrity of any element of Project.
.2 Integrity of weather exposed or moisture resistant elements.
.3 Efficiency, maintenance, or safety of any operational element.
.4 Visual qualities of sight exposed elements

1.3 Materials

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

.3 Requests for change in materials shall include documentation indicating conformance to project requirements and intent.

1.4 Definitions

.1 Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

.2 Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.5 Preparation

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.6 Execution

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide cutting and patching of all openings in non-structural elements of Work as necessary to complete installation of mechanical and electrical Work. Include complete removal and replacement of such elements as necessary to provide construction access.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools are not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with “ULC approved firestopping material, full thickness of the construction element. Include any openings in existing building elements created by removal of existing services or equipment.

.12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

PART 2 PRODUCTS

2.1 MATERIALS

.1 General: Comply with requirements specified in other Sections.

.2 In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

.3 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 Cutting and Patching

.1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

.1 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

.2 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

.3 Temporary Support: Provide temporary support of work to be cut.

.4 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

.5 Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 - Summary of Work.

.6 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

.7 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
- .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- .2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
- .3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
- .4 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
- .5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- .6 Proceed with patching after construction operations requiring cutting are complete.

.8 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
- .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
- .2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
  - .1 Clean piping, conduit, and similar features before applying paint or other finishing materials.
  - .2 Restore damaged pipe covering to its original condition.
- .3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

.1 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

.4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

.5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

.9 Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Progressive Cleaning

.2 Final Cleaning

1.2 Project Cleanliness

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use clearly marked separate bins for recycling.

.7 Remove debris daily. The work site must be left clean and tidy upon completion, to the satisfaction of the Consultant.

.8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

PART 2 PRODUCTS

2.1 Products

.1 All cleaning materials and products shall be low VOC type. Submit list of cleaning products including MSDS for approval prior to commencement of cleaning operations.

.2 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 Final Cleaning

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.

.6 Clean lighting reflectors, lenses, and other lighting surfaces.

.7 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.8 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.9 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.10 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.11 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 Related Work

.1 Section 01 78 00 Closeout Submittals

1.3 References

.1 Canadian Construction Documents Committee CCDC 2-2020, Stipulated Price Contract including Supplementary Conditions.
.2 OAA/OGCA Document 100 - Recommended procedures regarding Substantial Performance of Construction Contracts and Completion Takeover of Projects.
.3 The Construction Lien Act.

1.4 Inspection and Declaration

.1 Contractor's Inspection: The Contractor and all Sub-contractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
  .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  .2 Request Consultant's review.
.2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
.3 Completion: submit written certificate that following have been performed:
  .1 Work has been completed and inspected for compliance with Contract Documents.
  .2 Defects have been corrected and deficiencies have been completed.
  .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
  .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA and other regulatory agencies have been submitted.
  .5 Operation of systems have been demonstrated to Owner's personnel.
  .6 Work is complete and ready for Final Review by the Consultant.
.4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.
.5 Declaration of Substantial Performance: when Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and the Construction Lien Act for specifics to application.
.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
.7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.7 for specifics to application.

.8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2, General Conditions Article 5.5

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

.

PART 1 GENERAL

1.1 Section Includes

.1 As built, samples, and specifications.
.2 Equipment and systems.
.3 Product data, materials and finishes, and related information.
.4 Operation and maintenance data.
.5 Spare parts, special tools and maintenance materials.
.6 Warranties and bonds.
.7 Final site survey.

1.2 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.3 Submission

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 At least 2 weeks prior to commencement of scheduled commissioning activities, submit 2 copies of the DRAFT Operating and Maintenance Manuals, for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor 1 DRAFT copy, with review comments, for revision. Submit 1 copy of the revised Operating and Maintenance for approval prior to the production of FINAL copies. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the FINAL Operating and Maintenance Manuals.

.3 Building will not be deemed ready for use unless the draft copies of the Operating and Maintenance Manuals and the "As-built" Record Documents have been submitted and reviewed by the Consultant.

.4 Building will not be deemed ready for use unless the completed and submitted Operating and Maintenance Manuals and "As-built" Record Documents have been accepted by the Consultant.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.4 Format

.1 Organize data in the form as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in .dwg format on CD.

1.5 Contents Each Volume

.1 Table of Contents: provide title of project;
  .1 Date of submission; names.
  .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  .3 Schedule of products and systems, indexed to content of volume.

.2 .For each product or system:
  .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control

1.6 Occupant Manual

.1 Submit Occupant Manual to Consultant’s requirements.

.2 Occupant Manual to include:
  .1 General building information.
  .2 Building management.
  .3 Building operations.
  .4 Safety.
  .5 Security.
  .6 Environmental considerations.

.7 Communications.
.8 Contact List.
.9 Other/Miscellaneous.

1.7 As Builts and Samples

.1 In addition to requirements in General Conditions, maintain at the site for Consultant one record copy of:
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders and other modifications to Contract.
.5 Reviewed shop drawings, product data, and samples.
.6 Field test records.
.7 Inspection certificates.
.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Consultant.

1.8 Recording Actual Site Conditions

.1 Record information on set of drawings, provided by Consultant.

.2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
.1 Measured depths of elements of foundation in relation to finish first floor datum.
.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.4 Field changes of dimension and detail.
.5 Changes made by change orders.
.6 Details not on original Contract Drawings.
.7 References to related shop drawings and modifications.

.4 Submit following drawings:
.1 Record changes in red. Mark on one set of prints and at completion of project prior to final inspection, produce electronic “as-built” records on disk using latest version of AutoCad. Annotate “AS-BUILT RECORD” in each drawing title block.

.2 All changes shall be shown on a separate drawing layer named "as-built".

.3 At least 2 weeks prior to commencement of scheduled commissioning activities, submit one copy of the DRAFT "As-built" Project Record Documents for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor the DRAFT copy, with review comments, for revision. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the FINAL "As-built" Project Record Documents and disk of "as-built" record drawings.

.5 Specifications: legibly mark each item to record actual construction, including:
.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections

1.9 Final Survey

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.10 Equipment and Systems

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with Engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor’s co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control

.15 Additional requirements: as specified in individual specification sections.

1.11 Materials and Finishes

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.12 Spare Parts

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Spare parts as identified in individual sections are to be delivered to the Owner prior to the Contractor’s application for Substantial Performance.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.13 Maintenance Materials

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Maintenance materials are to be delivered to the Owner prior to the Contractor’s application for Substantial Performance.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.14 Special Tools

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Special tools are to be delivered to the Owner prior to the application for Substantial Performance.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.15 Storage, Handling and Protection

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.16 Warranties and Guarantees

.1 Separate each warranty or guarantee with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and guarantees, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

.5 Verify that documents are in proper form, contain full information, and are notarized.

.6 Co-execute submittals when required.

.7 Retain warranties and guarantees until time specified for submittal.

1.17 Independent Specialty Engineers Sign-Off

.1 Prior to Substantial Performance, provide copies of signed and stamped engineers review and sign-off letters stating that the work has been built in accordance with their drawings and designs. Conditional or vague letters of sign-off will not be accepted. All specialty design engineers for all

sub-contractors and suppliers will be required to review the work in progress at appropriate intervals to ensure compliance with their designs and drawings and shall provide final sign-off letters. Provide copies of all field reports issued by specialty engineers. Carry all costs associated with full compliance with this requirement.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Procedures for demonstration and instruction of equipment and systems to Owner's personnel.

1.2 Description

.1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two (2) weeks prior to date of Substantial Performance.

.2 Owner will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.3 Quality Control

.1 When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Owner's approval.

.3 Submit reports within one (1) after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

1.5 Conditions for Demonstrations

.1 Equipment has been inspected and put into operation.

.2 Testing, adjusting, and balancing have been performed and equipment and systems are fully operational.

.3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions

1.6 Preparation

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated personnel are present

1.7 Demonstrations and Instructions

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times.

.2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.

.3 Review contents of manual in detail to explain aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 References

.1 The National Building Code of Canada, Part 8-Safety Measures on Construction and Demolition Sites.
.2 ASTM International (ASTM)
  .1 ASTM F710-19e1 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
.3 CSA Group (CSA)
  .1 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
.4 Ontario Regulation 102/94 Waste Audits and Waste Reduction Work Plans.
.5 Ontario Regulation 103/94 Environmental Protection Act.
.6 Ontario Regulation 213/07 The Fire Code.
.7 Ontario Regulation 232/98 Landfilling Sites.
.8 Ontario Regulation 278/05 Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations.
.9 Ontario Regulation 347 Environmental Protection Act, General — Waste Management.
.10 Ontario Regulation 332/12 The Building Code.
.11 The Workplace Health and Safety Act, and Regulations for Construction Projects.
.12 The Contractors Health and Safety Policy.
.13 Laws, rules and regulations of other authorities having jurisdiction.

1.3 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit detailed written schedule, methodology and proposed procedures for demolition, including a Safe Work Plan for review prior to commencement of demolition.

.3 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details clearly showing sequence of disassembly work or supporting structures and underpinning.

.4 Drawings for structural elements of the demolition process including shoring, underpinning and installation of new lintels or beams in existing load bearing walls, shall bear signature and stamp of qualified professional engineer registered in the Province of Ontario.

.5 Submit proposed dust-control measures.

.6 Submit proposed noise-control measures.

.7 Submit schedule of demolition activities indicating the following:
  .1 Detailed sequence of demolition and removal work, including start and end dates for each activity.
  .2 Dates for shutoff, capping, and continuation of utility services.

.8 If hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

.9 At Project Closeout: Submit record drawings in accordance with Section 01 78 00. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions

1.4 Permits

.1 Obtain and pay for all permits and comply with all laws, rules, ordinances, and regulations relating to Demolition of Building and preservation of Public Health and Safety.

.2 The Consultant will complete General Review during demolition in accordance with the Ontario Building Code. All other engineering required for shoring design and for other structural elements of the demolition work will be completed by the Contractor's own engineer and paid for by the Contractor.

1.5 Definitions

.1 Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.

.2 Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.

.3 Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human or animal life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.

.4 Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively for the purpose of disposal.

.5 Inert Solids/Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete that does not contain hazardous substances or soluble pollutants at concentrations in excess of water-quality standards established by a regional water board and does not contain significant quantities of decomposable solid waste.

.6 Landfill: A landfill that accepts non-hazardous materials such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A landfill must have a solid waste facilities permit from the Ministry of the Environment and be in conformance to O. Reg 232/98.

.7 Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

.8 Remove: Remove and legally dispose of items, except those identified for use in recycling, re-use, and salvage programs.

.9 Reuse: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.

.10 Solid Waste: All putrescible and non-putrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by law.

1.6 Quality Assurance

.1 Demolition Firm Qualifications: Demolition contractor shall be an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.

.2 Regulatory Requirements: Comply with governing regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Obtain and pay for all permits required.

.3 Pre-demolition Conference: Conduct a conference at Project site.
.1 Review the environmental goals of this Project and make a proactive effort to increase awareness of these goals among all labor forces on site.
.2 Review schedule and scheduling procedures.
.3 Review health and safety procedures.
.4 Review of Project conditions including review of record photographs.

1.7 Project Conditions

.1 Construct safety barriers, barricades, fencing and hoarding to separate work areas from adjacent spaces within the building to avoid migration of dust, dirt, and/or construction debris.

.2 The Owner assumes no responsibility for the actual condition of the structures to be demolished.

.3 Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. Variations within the structures may occur by the Owner's salvage operations prior to start of demolition.

1.8 Designated Substances

.1 Refer to Non-Intrusive Designated Substances Survey provided for areas of abatement to be completed as identified to complete the project scope of work.

.2 Should any other material not identified in the above referenced reports resembling asbestos or other hazardous substances be encountered in course of demolition work, immediately stop work and notify the Owner’s Representative. Refer to Section 01 41 00.

PART 2 PRODUCTS

2.1 Materials

.1 Provide all materials necessary for temporary shoring. On completion, remove temporary materials from site.

.2 All building materials removed from the building shall become the property of the Contractor unless specified otherwise and shall be reused in new construction or removed from the Site.

.3 All concrete, masonry, asphalt and similar materials shall be crushed prior to disposal.

2.2 Salvage

.1 All items of salvageable value must be salvaged.

.2 Provide a schedule of items to be salvaged and clearly indicate which items are to be retained by Owner. Clearly identify and tag each salvageable item.

.3 Transport salvaged items from the site as they are removed.

.4 Items of salvageable value to the Contractor may be removed from the structure as the work progresses, if such items are not claimed by the Owner.

2.3 Reuse

.1 Salvage and reuse materials as indicated on the drawings.

2.4 Recycle

.1 All materials from demolition and land clearing which can be recycled through local municipal programs and which is not scheduled for salvage shall be sorted and separated in accordance with Regional, Provincial and Municipal standards and regulations.

.2 Provide recycling receptacles for the duration of construction activities at the building site.

PART 3 EXECUTION

3.1 Examination

.1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition, salvage and recycling required.

.2 Verify that utilities have been disconnected and capped.

.3 Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.

.4 Retain a licensed and qualified civil or structural engineer to provide analysis, including calculations, necessary to ensure the safe execution of the demolition work.

.5 Perform surveys and tests as the Work progresses to detect hazards resulting from demolition activities.

.6 Preliminary Survey:
.1 The Demolition Plans indicate the general extent of existing conditions based upon drawings provided by the Owner and existing site conditions. Review all areas of work to determine

full extent of areas to be demolished, altered or renovated and become familiar with actual conditions and extent of work required.

.2 Before commencing demolition operations, examine Site and provide engineering survey to determine type of construction, condition of structure, and Site conditions. Assess strength and stability of damaged or deteriorated structures.

.3 Assess potential effect of removal of any part or parts on the remainder of structure before such part(s) are removed.

.4 Assess effects of demolition at adjacent structures and consider need for underpinning, shoring and/or bracing.

.5 Investigate for following conditions:

.1 load bearing walls and floors
.2 structure suspended from another
.3 effects of soils, water, lateral pressures on retaining or foundations walls
.4 presence of tanks and other piping systems
.5 presence of designated substances and hazardous materials.

.7 After determining demolition methods, determine area of possible vibration. Carefully inspect beyond those adjacent areas. List potential damage areas and photograph each for record purposes before starting work.

3.2 Preparation

.1 Erect and maintain dustproof and weatherproof partitions as required to prevent spread of dust, fumes and smoke to other parts of building. Maintain fire exits. On completion, remove partitions and make good surfaces to match adjacent surfaces of building.

.2 Provide all shoring and bracing required for the execution of the work.

.3 Ensure all sedimentation controls as required are in place prior to commencement of demolition activities.

.4 Before commencing demolition, verify that existing water, gas, electrical and other services in areas being demolished are cut off, capped diverted or removed as required. Post warning signs on electrical lines and equipment which must remain energized to serve adjacent areas during period of demolition.

.5 Conduct demolition operations and remove materials from demolition to ensure minimum interference with roads, streets, walks, and other adjacent occupied and utilized facilities.

.6 Do not close or obstruct streets, walks, or other adjacent occupied or utilized facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.3 Utilities

.1 Contact authorities or utility companies for assistance in locating and marking services passing under, through, overhead or adjacent to structure to be demolished. Such services include:

.1 Electrical power lines
.2 Gas mains
.3 Communication cables
.4 Fibre optic cables
.5 Water lines.

.6 Drainage piping (storm and sanitary).

.2 Before disconnecting, removing, plugging or abandoning any existing utilities serving the building:
.1 Notify the Owner, applicable utility companies, and local authorities having jurisdiction.
.2 Cut off and cap utilities at the mains on the property or in the street as required by the Owner and responsible utility company. Maintain fire protection to the existing buildings at all times.
.3 Remove, cut off and plug, or cap all utilities within the existing building areas to be demolished, except those designated to remain

3.4 Protection

.1 Provide safe access and egress from working areas using entrances, hallways, stairways or ladder runs, protected to safeguard personnel using them from falling debris.

.2 Do not interfere with use and activities of adjacent buildings and site. Maintain free and safe passage to and from buildings.

.3 Where demolition operations prevent normal access to adjacent properties, provide and maintain suitable alternative access.

.4 Provide flagmen where necessary or appropriate, to provide effective and safe access to site to vehicular traffic and protection to Owner’s personnel. Refer to Division 1 for safety requirements.

.5 Ensure that all necessary controls are in place at the beginning of each work period which will prevent the spread of contaminated material beyond the work area limits. Stop work immediately if there exists any possibility of the spread of contaminated materials.

.6 Keep dust from entering existing facilities and areas of building not affected by the Work. Comply with Ministry of Health requirements regarding debris control.

.7 Ensure scaffolds, ladders, equipment and other such equipment are not accessible to public. Protect with adequate fencing or remove and dismantle at end of each day or when no longer required.

.8 If Owner considers additional bracing and shoring necessary to safeguard and prevent such movement or settlement, install bracing or shoring upon Owner's orders.

.9 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger new work or existing premises.

.10 Protect existing adjacent work against damages which might occur from falling debris or other causes due to work of this Section.

.11 At all times protect the structure from overloading.

.12 Provide protection around floor and/or roof openings.

.13 Protect from weather, parts of adjoining structures not previously exposed.

.14 Protect interiors of building parts not to be demolished from exterior elements at all times.

.15 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling.

3.5 Temporary Ventilation

.1 Provide all required temporary ventilation for demolition work.

3.6 Environmental Controls

.1 Comply with provincial and municipal regulations pertaining to water, air, solid waste, recycling, chemical waste, sanitary waste, sediment and noise pollution.

.2 Protection of Natural Resources:
- .1 Preserve the natural resources.
- .2 Confine demolition activities to areas defined by public roads, easements, and work area limits indicated on the drawings.
- .3 Water Resources: Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters. Provide sedimentation control where necessary.
- .4 Store and service construction equipment at areas designated for collection of oil wastes.
- .5 Oily Substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water in such quantities as to affect normal use, aesthetics, or produce a measurable ecological impact on the area.

.3 Dust Control, Air Pollution, and Odour Control: Prevent creation of dust, air pollution and odors.
- .1 Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
- .2 Store volatile liquids, including fuels and solvents, in closed containers.
- .3 Properly maintain equipment to reduce gaseous pollutant emissions.

.4 Noise Control: Perform demolition operations to minimize noise.
- .1 Provide equipment, sound deadening devices, and take noise abatement measures that are necessary to comply with municipal regulations.

.5 Salvage, Re-Use, and Recycling Procedures:
- .1 Identify re-use, salvage, and recycling facilities.
- .2 Develop and implement procedures to re-use, salvage, and recycle demolition materials.
- .3 Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
- .4 Source-separate clean and uncontaminated demolition materials including, but not limited to the following types:
  - .1 Concrete, Concrete Block, Concrete Masonry Units (CMU), Brick.
  - .2 Metal (ferrous and non-ferrous).
  - .3 Wood.
  - .4 Glass.
  - .5 Plastics and Insulation.
  - .6 Gypsum Board.
  - .7 Porcelain Plumbing Fixtures.
  - .8 Fluorescent Light Tubes.
  - .9 Paper: Bond, Newsprint, Cardboard, Paper, Packaging Materials.
  - .10 Other materials as appropriate.

3.7 Performance

.1 Ensure demolition work is supervised by competent foreman at all times.

.2 Demolition shall proceed safely in systematic manner. Work on each floor level shall be complete before commencing work on supporting structure and safety of its supports are impaired. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.

.3 Until acceptance, maintain and preserve active utilities traversing premises.

.4 Provide enclosed chutes for disposal of debris from heights more than 1 storey in accordance with CSA S350.

.5 Maintain safety of site by shoring below-grade-structures and excavations resulting from demolition against collapse.

3.8 Demolition

.1 Review demolition procedures to ensure no personnel or equipment are located or working without additional safe working platforms or working surface adequate to support the operations.

.2 Any damage caused to the adjacent buildings or properties by the neglect of the Contractor or any of his forces shall be made good at the expense of the Contractor including all costs and charges which may be claimed by the Owner for damages suffered.

.3 Demolish in a manner to minimize dusting. Keep dusty materials wetted at all times.

.4 Demolition: Use methods required to complete Work within limitations of governing regulations and as follows:
- .1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .2 Demolish concrete and masonry in sizes that will be suitable for acceptance at recycling or disposal facilities.
- .3 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- .4 Break up and remove concrete slabs on grade in small sizes, suitable for acceptance at recycling or disposal facilities, unless otherwise shown to remain.
- .5 Remove all disconnected, abandoned utilities.
- .6 Remove all finishes, fixtures, fitments and services as indicated
- .7 Damages: Promptly repair damages to adjacent facilities caused by demolition operations.
- .8 Prevent access to excavations by means of fences or hoardings.

3.9 Selective Demolition

.1 Carefully dismantle and remove all items in as shown and as necessary to complete the work.

.2 Salvage items scheduled for reuse or to be handed over to the Owner.

.3 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger the existing buildings.

.4 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.

.5 Return areas to condition existing prior to the start of the work unless indicated otherwise.

.6 At exterior and interior bearing walls to be removed, include breaking out and removal of existing concrete foundations to a minimum of 200 mm below new finished floor level.

3.10 Handling of Demolished Materials

.1 Conform to the approved Waste Management Plan.

.2 Do not allow demolished materials to accumulate or be stored on-site for more than 5 days.

.3 Do not burn, bury or otherwise dispose of rubbish and waste materials on project site.

.4 Pallet and shrink-wrap materials scheduled for re-use and stockpile where directed on site.

.5 Disposal: Transport demolished materials off Owner's property and legally reuse, salvage, recycle, or dispose of materials. Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

.6 Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.

3.11 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Clean adjacent streets and driveways of dust, dirt and materials caused by demolition operations.

.3 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

.4 Upon completion of demolition work, remove debris, trim surfaces and leave work site clean.

.5 Video storm and sanitary sewers and jet clean where debris may have accumulated

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

.2 It is the intent of this specification to protect historic structures to the greatest extent possible. Use the gentlest means to perform the work and take the greatest of care to ensure that the historic materials are not damaged in the process of the work.

.3 The existing building located at Water Street in Whitby and is a designated heritage building. When completing work on the existing building the contractor must exercise extreme care and caution to ensure that as much of the original building components are preserved during the restoration work. Any damage caused to the original building structure as a result of poor construction practice shall be restored to the original condition at no additional cost to the owner.

.4 Refer to the Designated Substances Survey for the Pumphouse Facility in Whitby.

.5 Recommended procedures for masonry stabilization is by use of hand tools. Any paint must be removed from locations in accordance with approved abatement procedures where power cutting tools are proposed.

.6 Protect all existing roofs and other surfaces during brick and mortar removal where lead paint is present by placing tarpaulins on all adjacent horizontal and vertical surfaces.

1.2 Related Sections

.1 Section 04 01 20.19 Unit Masonry Restoration
.2 Section 04 05 13.13 Masonry Restoration, Historic Mortars
.3 Section 04 05 13.91 Masonry Restoration Mortaring
.4 Section 04 05 19 Masonry Anchorage and Reinforcing
.5 Section 07 92 00 Joint Sealants

1.3 References

.1 The Standards & Guidelines for the Conservation of Historic Places in Canada
.2 ASTM International (ASTM)
  .1 ASTM A36/A36M-12 Standard Specification for Carbon Structural Steel
  .2 ASTM C34-13 Structural Clay Load-Bearing Wall Tile
  .3 ASTM C67-13a Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile
  .4 ASTM C144-11 Standard Specification for Aggregate for Masonry Mortar
  .5 ASTM C170/C170M-09 Standard Test Method for Compressive Strength of Dimension Stone
  .6 ASTM C207-06 (2011) Standard Specification for Hydrated Lime for Masonry Purposes
  .7 ASTM C216-14 Facing Brick (Solid Masonry Units Made from Clay or Shale)
  .8 ASTM C881/C881M-13 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
  .9 ASTM C1324-10 Standard Test Method for Examination and Analysis of Hardened Masonry Mortar
  .10 ASTM C1489 - 01(2008)e1, Standard Specification for Lime Putty for Structural Purposes
  .11 ASTM E11-13 Wire Cloth and Sieves for Testing Purposes

.12 ASTM E96/E96M-13 Standard Test Methods for Water Vapour Transmission of Materials
.3 Ontario Ministry of Labour Guidline
.1 Lead on Construction Projects, 2011.
.4 Government of Ontario Occupational Health and Safety Act
.1 O. Reg. 490/09 Designated Substances.
.5 American Conference of Governmental Industrial Hygienists
.1 ACGIH 0100 Documentation of the Threshold Limit Values and Biological Exposure Indices.

1.4 Submittals

.1 Submit Product Data.

.2 Submit mortar mixes and test results.

.3 Submit proposed restoration methods and materials.

.4 Submit temporary scaffold / swing stage design and methodology as required to complete the work. Apply for and obtain building permits for all the temporary structures. Submit scaffolding designs stamped and signed by an engineer registered in the Province of Ontario.

.5 Prepare road/laneway/side protection and/or closure plans as required to complete the work. Obtain all necessary building permits to complete the work.

1.5 Definitions

.1 Aggregates: The sand component of mortar.
.2 Biocides: A chemical treatment meant to eliminate organic growth on the masonry units and mortar and prohibit re-growth.
.3 Binder: The component of mortar that binds together the aggregate particles into a cohesive material.
.4 Dispersed Lime Crack Injection: A repair method in which dispersed lime material is injected into small hairline cracks by use of needle or syringe.
.5 Insitu: A term referencing a repair procedure in which the masonry units and mortar remain in place and are repaired without removal from the wall system
.6 Joint Sealant: A flexible, chemical product that is used to create a weather-tight seal at the boundary of masonry units with other units or dissimilar materials.
.7 New Elements: New, non-historic materials added to masonry structures to aid in their ability to resist loads (typically seismic) or to resist water infiltration.
.8 Patch: The use of substitute repair materials to treat damaged or deteriorated masonry units.
.9 Restoration: The practice of restoring a historic masonry structure and its component materials with the intent to maintain the original fabric to the greatest extent possible.
.10 Remove: Specifically for historic masonry materials, the term means to detach an item from existing construction to the limits indicated.
.11 Replace: To reinstall an item in its original position (or where indicated) after remedial treatment, or to duplicate and reinstall an entire item with new material; with the original item serving as the pattern for creating the duplicate.
.12 Repoint: To remove existing mortar joints to the specified depth and replace with a mortar that matches in colour, texture, and performance with maximum breathability, bond, and flexibility to accommodate movement.

.13 Surface Treatment: The application of traditional materials or contemporary chemical products to the surface of masonry to provide protection to the masonry units and mortar and/or prevent water infiltration.
.14 Masonry Treatment Requirement (MTR): Defined treatments that are required by the specification (contract) documents for project specific repairs to masonry.
.15 Saturated Surface Dry (SSD): Defined as a condition of the wall surface after water has been applied and allowed to dry to a point with no standing water visible.

1.6 Quality Control

.1 Submit resumes for all historic masonry workers, demonstrating the minimum experience required. Product manufacturers, vendors, distributors, or suppliers of materials will not be permitted to offer on-site project training certificates or historic masonry consultation services.

.2 Quality Control Plan
  .1 Prior to beginning restoration and cleaning work, submit a written Quality Control Plan.
  .2 Do not proceed without written approval of the plan. At a minimum, include the items in the Quality Control Plan
    .1 Describe methods of paint removal. (Refer to DSS report provided by the Owner)
    .2 Describe methods of dust containment during the work specific to the restoration and cleaning work.
    .3 Describe the methods of protecting surrounding masonry, windows, doors, roof, and building trim as well as surrounding landscape and paved areas.
    .4 Describe the work procedures, materials, and tools proposed for each MTR specified.
    .5 Describe the methods for select deconstruction of individual masonry units and tools for cleaning the masonry for reuse.
    .6 Describe the method and approach to mortar joint removal.
    .7 Describe the method and approach to cleaning mortar coating smears and old patching materials from the masonry surfaces.
    .8 Describe the complete masonry removal and matching procedures; include equipment, approach, length of time the masonry will be out of the wall, documentation on mapping the location, and where (on-site or in shop) the masonry units will be repaired.
    .9 Describe the procedure for mixing and matching of substitute repair materials.
    .10 Describe the methods and system by which the use of reclaimed masonry units can be utilized.
    .11 Describe the methods for setting masonry back into its original position and maintaining the original bond patterns and joint width.

.3 Qualifications
  .1 Masonry Firm
    .1 The firm performing the masonry work shall have a minimum of five years of heritage masonry restoration / preservation experience on similar projects. The firm shall have completed work similar in material, design, and extent to that indicated for this Project and shall demonstrate a record of successful in-service performance.
  .2 Field Supervision
    .1 Retain an experienced full-time supervisor on the project site at all times when masonry restoration and stabilization is in progress. A single individual shall be responsible for supervising the historic masonry restoration work throughout the duration of the project.
  .3 Masonry Applicator

.1 Employ craftspeople who are experienced with and specialize in restoration work of the types they will be performing. All masonry restoration treatments must be performed by a craftsperson that is familiar with historic masonry construction and has worked on historic masonry projects for at least five years. Only skilled journeyman masons who are familiar and experienced with the materials and methods specified may be used.

.4 Documentation

.1 Submit digital photographic documentation of the all phases of masonry restoration, including prior to the start of restoration work. The photo survey will be used by Toronto Hydro assist with providing records of the completed work areas. Provide thorough photo documentation of the project and project details and targeted areas.

.5 Restoration Mock-ups

.1 Submit the restoration methods, and materials for approval before work starts. Take into account the total construction system of the building to be worked upon, including different masonry and mortar materials, as well as non-masonry elements which may be affected by the work. Utilize mockups to identify the appropriate restoration applications, treatments, and materials for each project task. Demonstrate the correct execution of the approved restoration methods and materials during the on-site workmanship training program.

.6 Mock-ups

.1 Prepare and/or submit mock-ups of each treatment proposed for use in the work. No masonry or mortar shall be used in the work until the mock-ups and the represented material and workmanship have been approved. Materials shall be submitted and approved prior to the creation of mock-ups. The location for placement, size, and location of mock-ups will be as directed by the Consultant and Owner.

.2 Mock-ups must demonstrate the methods and quality of workmanship to be performed in each masonry treatment requirement (MTR). Provide a mockup for each MTR indicated.

.1 Prepare mock-ups on existing walls under the same weather conditions expected during the remainder of the work.

.2 Throughout restoration, retain approved mock-up panels in undisturbed condition, suitably marked, as a standard for judging completed work.

.3 Review manufacturer's product data sheets to determine suitability of each product for each surface.

.4 Apply products using manufacturer-approved application methods, determining actual requirements for application.

.5 Obtain approval as to the preservation treatment approach, design, and workmanship to include, but not limited to the verification of all material applications and finishes as specified to the requirements of colour, texture, profiles, and finishes before proceeding with work.

.6 Mock-ups: May be performed on inconspicuous sections of actual construction

.1 Location and number as directed.

.2 Size: 600 mm by 900 mm or as appropriate for the repair specified

.3 Repair unacceptable work.

.7 Repointing: Repoint mortar joints, minimum acceptable mock up dimensions: one (1) metres in length - 2/3 horizontal joints and 1/3 vertical joints. Demonstrate method for cutting out mortar joints, preparing wall for repointing, mixing mortar, installing mortar and curing the mortar.

.8 Masonry Removal and Replacement

.1 Fully remove masonry and replace with new unit matching original size and texture.

.2 Select size of masonry units representing typical conditions. Return one masonry unit to same location, set to surrounding profile joint width and bond pattern to match existing. Set masonry unit using specified mortar. Confirm with Consultant that the replacement masonry units meet specification requirements for matching and that sufficient quantity required for the work have been identified.

.9 New Masonry Elements

.1 Install new accessories in a manner demonstrating their final installation on the structure.

1.7 Preconstruction Conference

.1 Prior to beginning the work, convene a meeting with the Consultant, Owner and all associated trades involved in the work, to review the requirements of the Quality Control Plan, installation procedures, location of required mockup areas, and all job conditions and processes.

1.8 Shipping, Handling and Storage

.1 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.2 Furnish cement in suitable bags used for packaging cements. Labeling of packages shall clearly define contents, manufacturer, and batch identification. Detergents, masonry cleaners, paint removers, solvents, epoxies and other chemicals used for masonry cleaning shall be in sealed containers that legibly show the designated name, formula or specification number, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer.

.3 Store materials in weathertight structures which will exclude moisture and contaminants. Accessories shall be stored avoiding contamination and deterioration. Admixtures which have been in storage on site for six months or longer, or which have been subjected to freezing, shall not be used unless retested and proven to meet the specified requirements.

1.9 Project Conditions

.1 General Ambient Conditions

.1 Masonry, mortar, and epoxy adhesives shall not be placed when weather conditions detrimentally affect the quality of the finished product. No masonry or mortar shall be placed when the air temperature is below 5° C in the shade. When air temperature is likely to exceed 35° C masonry and mortar shall have a temperature not exceeding 35° C when deposited.

.2 Materials to be used in the work shall be neither produced nor placed during periods of rain or other precipitation. Stop material placements, and protect all in-place material from exposure, during periods of rain or other precipitation. Masonry surfaces shall be cleaned only when air temperatures are above 5° C and will remain so until masonry has dried out, but for not less than 7 days after completion of the work.

.2 Masonry Installation Conditions

.1 Do not perform any masonry repointing unless air temperatures are between 10° C and 32° C and will remain so for at least 48 hours after completion of work. Phase repointing during hot weather by completing process on the shady side of the building or schedule installation of materials during cooler evening hours to prevent premature evaporation of the water from the mortar. Do not use frozen materials or materials mixed or coated with ice or frost. Do not lower the freezing point of mortar by the use of admixtures or anti-freeze agents.

.3 Do not add chlorides to the mortar. Prevent repointing mortar from staining the face of the masonry or other exposed surfaces. Immediately remove all repointing mortar that comes in contact with such surfaces.

.4 Cover partially completed work when work is not in progress. Protect sills, ledges and projections from mortar droppings. If the Contractor fails to protect against building damage as a result of work of this Section, such damage shall be the Contractor's responsibility. The Contractor shall restore damaged areas to the complete satisfaction of the Owner at no expense to the Owner. Do not apply products under conditions outside manufacturer's requirements, which include:
- .1 Surfaces that are frozen; allow complete thawing prior to installation.
- .2 Surface and air temperatures below 5° C.
- .3 Surface and air temperatures above 35° C.
- .4 When surface or air temperature is not expected to remain above5° C for at least 48 hours after application.
- .5 Wind conditions that may blow materials onto surfaces not intended to be treated.

1.10 Warranty

.1 Cleaning Warranty
- .1 Warrant cleaning procedures for a period of two years against harm to substrate (masonry and mortar) or to adjacent materials including, but not limited to, discolouration of substrate from improper procedures or usage, chemical damage from inadequate rinse procedures, and abrasive damage from improper procedures.

.2 Repair Warranty
- .1 Warrant repair procedures, including repointing, new brick, patched holes, new brick coatings etc. for a period of two years against: discolouration or mismatch of new mortar to adjacent original historic mortar, discolouration or damage to masonry from improper mortar clean-up, loss of bond between masonry and mortar, fracturing of masonry edges from improper mortar joint preparation procedures or improper mortar formulation, and occurrence of efflorescence.

PART 2 PRODUCTS

2.1 Repair Materials

.1 Mortar: refer to Section 04 05 13.13

.2 Replacement Masonry Materials
- .1 Replacement Brick: Refer to Section 04 01 20.19.

.3 Masonry Elements
- .1 Metal Attachments: refer to Section 04 05 19.
- .2 Epoxy Anchor Adhesives
  - .1 Use an epoxy-resin grout to bond stainless steel anchors to masonry. The grout shall be a 100 percent solids, moisture insensitive, low creep, structural adhesive. The epoxy shall conform to ASTM C881/C881M, Type IV; Grade and Class selected to conform to the manufacturer's recommendations for the application.

PART 3 EXECUTION

3.1 Evaluation and Analysis

.1 Undertake masonry renovation only after complete evaluation and analysis of the areas to be repaired are completed, including sampling and testing of the existing mortar to determine its composition and qualities. No repair work shall be undertaken until conditions that have caused masonry deterioration have been identified. Correct such conditions, if possible, prior to start of the work.

.2 Mortar Analysis
- .1 The existing mortar must be sampled and tested to confirm the original mortar material compositions. The mortar must match all the original mortar properties. Note: Historic mortars are usually softer than newer mortars, often using lime as a binder rather than cement. Lime for repointing mortar shall conform to ASTM C207, Type S, or ASTM C1489 unless otherwise specified. Full laboratory analysis of the existing mortar shall conform to ASTM C1324, and include methods for precise determination of the binder constituents. Field analysis of the existing mortar shall be as specified below.
- .2 Field (Insitu) Mortar Analysis
  - .1 Analyze the mortar composition and detect cracks, degradation and de-bonding from the surrounding masonry. Also determine previous surface coating treatments that may be contributing to the current conditions.
  - .2 Compare the bedding mortar with the pointing mortar and determine the cross-sectional characteristics of the wall.
  - .3 Determine the level of moisture movement in the insitu mortar, and if the mortar or masonry units are handling the brunt of the water movement through the wall.
  - .4 Assess the physical characteristics of the mortar and determine indirect compressive strength. Gather data on insitu mortar joint shear strength.
- .3 Taking and Preparation of Samples
  - .1 Take and analyze samples of unweathered original historic mortar and different type of mortar in the structure in order to match the new mortar to be used for repointing. Remove three or four samples of each type of mortar to be matched with a hand chisel from several locations on the building. Set aside the largest sample for comparison with the repointing mortar. Place the remaining samples in labeled, sealed sample bags for transport to the laboratory.
- .4 Laboratory Mortar Analysis Equipment
  - .1 Equipment for evaluating historic mortar in the lab includes physical preparation and analysis equipment such as scales, ovens, compression machines, sieves, sieve shakers and the like. All lab equipment should be calibrated and in good working condition. To accurately determine the binder constituents and proportions requires additional equipment such as high magnification microscopes to perform petrography, specialized ovens to perform Differential Thermal Analysis and specialized equipment to perform X-Ray diffraction analysis. This specialized equipment should be operated and the results analyzed only by trained, experienced personnel.
- .5 Laboratory Masonry Unit Evaluation Equipment
  - .1 Equipment for evaluating masonry units in the lab includes physical preparation and analysis equipment such as scales, ovens, compression machines, freeze-thaw equipment, soaking chambers and the like. All lab equipment should be calibrated and in good working condition.

.3 Binder Analysis

.1 Subject a part of the historic mortar sample to Differential Thermal Analysis or X-ray Diffraction to determine the binder components.

.4 Aggregate Analysis
.1 Separate aggregate of the mortar sample from the binder. The separated aggregate shall be rinsed clean with water and dried. Examine the aggregate with a magnifying glass, and record the component materials as to range of materials, sizes, colours, as well as the presence of other materials. Perform sand analysis using a sieve analysis of the aggregate as part of the ASTM C1324 process.

3.2 Preparation

.1 Material Handling and Associated Equipment
.1 Mixing, Transporting, and Placing Job Materials
.1 Provide equipment used for mixing, transporting, placing, and confining masonry and mortar placements capable of satisfactorily mixing material and supporting uninterrupted placement operations. Equipment used for mixing, conveying, and placing of materials shall be clean, free of old materials and contaminants, and shall conform to the material manufacturer's recommendations.
.2 Associated Equipment
.1 Provide associated equipment, such as mixer timing equipment, valves, pressure gauges, pressure hoses, other hardware, and tools, as required to ensure a continuous supply of material and operation control.

.2 Protection
.1 Protect persons, motor vehicles, adjacent surfaces, surrounding buildings, equipment, paving and landscape materials from chemicals used and runoff from cleaning and paint removal operations. Erect temporary protection covers, which will remain in operation during the course of the work, over pedestrian walkways and at personnel and vehicular points of entrance and exit.
.2 Interior Protection
.1 Protect the interior of buildings from the weather, cleaning, and repair operations.
.3 Worker Exposures
.1 Exposure of workers to chemical substances shall not exceed the limits established by ACGIH 0100, or those required by a more stringent applicable regulation.
.2 Refer to Designated Substances reports and abatement procedures provided by the Owner for cleaning and disposal of lead based pain.

3.3 Equipment and Techniques Demonstration

.1 Demonstrate equipment and techniques of operation in an approved location.

.2 Dependable and sufficient equipment, appropriate and adequate to accomplish the work specified, shall be assembled at the work site in sufficient lead time before the start of the work to permit inspection, calibration of weighing and measuring devices, adjustment of parts, and the making of any repairs that may be required. Maintain the equipment in good working condition throughout the project.

3.4 Masonry Repair

.1 Use only approved power tools for chipping and cleaning.

.2 Match repaired surfaces with adjacent existing surfaces in all respects.

.3 Proceed with masonry repair only after the cause of deterioration has been identified and corrected. Demonstrate the materials, methods and equipment proposed for use in the repair work in test panels. The location, number, size and completed test panels is subject to approval. Use products in accordance with the manufacturer's instructions.

.4 Perform a field investigation to determine the causes and extent of degradation. To facilitate the investigation utilize the following techniques.
  .1 Employ moisture meters to determine the level of moisture in the mortar and masonry, and if the mortar or masonry units are handling the brunt of the water movement through the wall. Infrared thermography, employed by a trained investigator, can provide additional information on the moisture conditions. Employ rilem tubes to determine the rate of water uptake into the masonry. To access the physical characteristics of hard mortar, use a spring loaded impact device to determine indirect compressive strength. For evaluating softer mortars, mortar integrity deeper in the wall, and the condition of the masonry units, a drill resistance tool shall be employed by an experienced consultant. Utilize technologies such as ground penetrating radar or metal detection equipment to map metal reinforcement and embedments in the wall. Use flat (bladder) jacks or jacks and rams to gather data on insitu mortar joint shear strength and deformation and stress in the wall.

.5 Repointing Masonry
  .1 Wall Preparation
    .1 Remove old caulking, grout, or non-original mortar from previously repaired joints to a minimum depth of 2.5 times the width of the joint. Cut all joints (unless otherwise noted) back to sound, solid, back up material. Leave a clean, square face at the back of the joint to provide for maximum contact of repointing mortar.'
      .1 Prepare a demonstration for the consultant and owner approval showing the proposed repointing methodology which proves that the method will not cause damage to the original existing brick.
      .2 Shallow or feather edging is not permitted. Remove loose particles from joints. Clean joints, followed by blowing with filtered, dry, compressed air or vacuum.
      .3 Existing horizontal mortar joints (bed joints) that are filled with a hard Portland mortar may be cut out using a diamond blade that is narrower than the joint width. The middle one-third of the mortar joint may be cut using a rotary power saw. The remaining mortar shall be removed from the masonry joints by hand using masonry chisels or pneumatic carving tools.
      .4 Vertical joints (head joints) shall not be cut out using rotary power saws. All vertical head joints must be removed by hand using a pneumatic carving tool, or hammer and chisel.
      .5 Remove existing historic lime-based mortar using only small-headed chisels that are no wider than half the width of the existing masonry joints. Pneumatic air carving chisels are permitted as are specially designed mortar removal reciprocating tools provided such equipment is equipped with vacuum packs and HEPA filters.
      .6 Do not widen the existing masonry joints. The surrounding masonry edges shall not be spalled or chipped in the process of mortar removal. Damage to surrounding

masonry units resulting from rotary blade over running is not permitted. Replace all masonry units damaged during mortar removal with replacement units that match the original.

.2 Mixing and Installation
  .1 Ensure appropriate material proportions as regards to the effect of moisture content on the individual components (cement, sand and lime. Batch materials using volumetric measurement devices (not shovels) and consistently consolidate the material in these devices to ensure the uniformity of the mortar.
.3 Batching
  .1 Utilize a calibrated measuring device for batching Portland cement.
  .2 Utilize a calibrated measuring device for batching hydrated lime or lime putty.
  .3 Utilize a calibrated measuring devices for batching the sand.
.4 Cement and Lime Proportions
  .1 Fill the measuring device with Portland cement, hydrated lime or lime putty.
    .1 Briskly strike the bottom of the measuring device against the ground a minimum of ten times and then strike the top flush.
    .2 For dry hydrate lime, fill the measuring device using a minimum of 3 lifts, strike the bottom of the measuring device against the ground a minimum of ten times and then strike the top flush. Dry hydrate lime experiences a significant volumetric loss when converted to a wet paste during mixing; therefore, add additional 25 percent dry hydrate lime to the formulation.
    .3 For lime putty briskly strike the bottom of the measuring device against the ground a minimum of ten times and then strike the top flush. No additional lime is required when measuring from putty.
.5 Sand Proportions
  .1 Proportion sand when the sand is in saturated surface dry (SSD), loose damp condition.
  .2 Proportion the sand by filling a measuring device using a minimum of 3 lifts, striking the sides a minimum of ten times, and then striking the top flush.

.6 Presoaking Masonry / Mortar Consistency/Lifts
  .1 Use the same mortar as the repointing mortar for setting the replacement masonry. Soak exposed surfaces of historic masonry adjacent to joint with water prior to repointing. Allow time for excess water to run off and evaporate prior to repointing. Joint surfaces shall be damp but free from standing water. Maintain a water sprayer on site at all times during the repointing process. The mortar material shall resemble the consistency of brown sugar during installation. This drier consistency enables the material to be tightly packed into the joint, allows for cleaner work, and prevents shrinkage cracks as the mortar cures. Point joints in layers or "lifts" where the joints are deeper than 32 mm. Apply in layers not less than 1/2 the depth but not more than 32 mm or until a uniform depth is formed.

.7 Compression / Joint Finish / Curing
  .1 Compress each layer thoroughly and allow it to become thumbprint hard before applying the next layer.
  .2 When mortar is thumbprint hard at the surface of the wall, finish the joints to match the original historic joint profile. Allow water evaporation from the freshly repointed walls in order to initiate the carbonation process in high lime content mortars. The carbonation of lime mortar initially requires wet-and-dry cycles, which can be created by water misting the joints after the mortar application when dry weather conditions prevail. Finish the joint profile before these cycles are started. Depending on the environmental conditions (temperature and

humidity), carry out water misting until a full nine alternating wet-and-dry cycles are completed.

.3 Adjust curing methods to ensure that the repointing mortar is damp without eroding the surface of the mortar.

.8 Protection

.1 Keep the mortar from drying out too quickly or from becoming too wet Protect it from direct sun and high winds for the first 72 hours after installation or from driving rain for the first 24 hours, using plastic sheeting if necessary. Be careful not to create a greenhouse effect by sealing off air movement in an attempt to protect the wall with plastic.

.2 Allow for air circulation to facilitate the carbonation process.

.9 Masonry Removal and Replacement

.1 Before removing any deteriorated masonry units, establish bonding patterns, levels and coursings. Remove masonry that has deteriorated or is damaged beyond repair, as determined through investigation and evaluation.

.2 Carefully demolish or remove entire units from joint to joint, without damaging surrounding units in a manner that permits replacement with full-size units. Support and protect remaining masonry work that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Notify Consultant of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items. Remove as many whole masonry units as possible without damage.

.1 Remove mortar, loose particles, and soil from masonry by cleaning with hand chisels, brushes, and water.

.2 Remove sealants by cutting close to masonry units with utility knife and cleaning with solvents. Clean surrounding masonry areas by removing mortar, dust, and loose particles in preparation for replacement.

.3 Replace removed masonry with harvested masonry units, where possible, or with new masonry units matching the existing units. Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated. Remove mortar used for laying/setting masonry units before mortar sets to the repointing depth of the surrounding area. Repoint new mortar joints in repaired area to comply with requirements for repointing existing masonry units.

.4 If a few isolated masonry units are to be replaced, remove each without disturbing the surrounding masonry. Remove deteriorated masonry units and mortar requiring replacement by hand chiseling. Do not damage adjoining masonry units during the removal of deteriorated units and mortar.

.5 Test the new element for fitting into its space without mortar. If wedges are used to support and align the new unit, cover them with at least 38 mm of mortar when pointing is complete.

.6 Cover the four sides and back of the space with sufficient mortar to ensure that there will be no air spaces when the new unit is set. Line up and set the new unit by tapping it into place with a wooden or rubber mallet. Align the face of new unit with that of existing masonry.

.7 Repoint joints to match the rest of the wall after new units have been properly installed and adjusted.

.8 Clean replacement areas with a non-metallic brush and water to remove excess mortar.

.10 Substitute Material Repair
- .1 Repair or replace original historic masonry materials only if surfaces are extensively deteriorated (surface missing to a depth of 100 mm or more) or are threatening the safety of the structure or individuals.
- .2 Deteriorated surfaces shall be removed and repaired or replaced only upon approval. Repairs and replacements shall match the materials, colours, and finish of the existing historic masonry as closely as possible.
- .3 Areas To Be Removed
  - .1 Remove unsound, weak, or damaged masonry and mortar in areas as indicated.
  - .2 Loose particles, laitance, spalling, cracked, or debonded masonry and mortar and foreign materials shall be removed with hand tools unless otherwise noted. Surfaces prepared for repair shall be cleaned free of dust, dirt, masonry chips, oil or other contaminants, rinsed with water, and dried before repair work is begun. Protect surfaces of the structure, and surfaces adjacent to the work area from damage which may result from removal, cleaning, and repair operations.
- .4 Masonry Replacement
  - .1 All damaged/deteriorated bricks which are being removed and replaced shall be replaced with a new brick matching the original size and texture. Submit proposed replacement brick samples to the consultant and owner for approval prior to proceeding.
- .5 Anchor Installation
  - .1 Clean anchors to remove all contaminants which may hinder epoxy bond.
  - .2 Epoxy adhesive shall be pressure injected into the back of the drilled holes. The epoxy shall fill the holes without spilling excess epoxy when the anchors are inserted. Insert anchors immediately into the holes. The anchors shall be set back from the exterior face at least 25 mm.
  - .3 Install anchors without breaking or chipping the exposed masonry surface.
  - .4 Where voids exist in the masonry units or between the wythes, use socks to contain the epoxy

3.5 New Elements

.1 Structural Upgrades
- .1 Mechanical anchors used to reinforce or stabilize masonry structures shall be designed by a registered professional structural engineer. Such strengthening measures shall take into account the current loads and stresses in the structure and the nature in which the building has historically managed thermal and other environmental changes or cycles. Submit manufacturers literature, design analysis and detail drawings for any proposed additional materials.

.2 Joint Sealant
- .1 Provide joint sealing as specified in Section 07 92 00 - Joint Sealants.

3.6 Protection of Work

.1 Protect work against damage from subsequent operations.

3.7 Defective Work

.1 Defective work shall be repaired or replaced, as directed, using approved procedures.

3.8 Final Inspection

.1 Following completion of the work, inspect the structure for damage, staining, and other distresses. The patches shall be inspected for cracking, crazing, delamination, unsoundness, staining and other defects.

.2 The finish, texture, colour and shade, and surface tolerances of the patches shall be inspected to verify that all requirements have been met.

.3 Repair surfaces exhibiting defects as directed.

3.9 Cleaning

.1 No sooner than 72 hours after completion of the repair work and after joints are sealed, faces and other exposed surfaces of masonry shall be washed down with water applied with a soft bristle brush, then rinsed with clean water. Discolourations which cannot be removed by these procedures, shall be considered defective work.

.2 Perform cleaning work when temperature and humidity conditions allow the surfaces to dry rapidly.

.3 Protect adjacent surfaces from damage during cleaning operations.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 01 00.91 Cleaning and Restoration of Masonry in Historic Structures
.2 Section 04 01 20 Masonry Procedures, Historic Restoration
.3 Section 04 05 13.13 Masonry Restoration, Historic Mortars
.4 Section 04 05 13.91 Masonry Restoration Mortaring
.5 Section 04 05 19 Masonry Anchorage and Reinforcing

1.3 References

.1 The Standards & Guidelines for the Conservation of Historic Places in Canada
.2 Canadian Standards Association (CSA)
  .1 CSA A82-14, Fired Masonry Brick Made from Clay or Shale
  .2 CAN/CSA-A179-04 (R2014) - Mortar and Grout for Unit Masonry
  .3 CAN/CSA-A371-04 (R2014) - Masonry Construction for Buildings
  .4 CSA S304.1-04 (R2010) - Design of Masonry Structures.
.3 Ontario Building Code

1.4 Submittals

.1 Submit samples of all materials to be used on the project

1.5 Quality Assurance

.1 Comply with The Standards & Guidelines for the Conservation of Historic Places in Canada.

.2 All repair and replacement materials shall match remaining material.

.3 As much historic material as possible shall be saved.

.4 All work shall be performed in the gentlest manner possible.

.5 Sound historic and other adjacent materials shall not be put at risk due to the restoration work.

1.6 Shipping, Handling and Storage

.1 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

PART 2 PRODUCTS

2.1 Materials

.1 Face Brick:
  .1 Reuse existing sound and undamaged brick wherever possible.
  .2 Replacement brick shall match in colour, shape, size, texture and appearance to the existing historic brick. Existing brick unit size is 8-3/8 x 2-3/8” x 4” with a combinations of Victorian

Red and Buff brick colours. Refer to the drawings for additional information. New brick shall conform to CSA A82-14.Test brick in comparison to the original existing historic brick using ASTM C67. Reclaimed brick shall be used only upon Consultant approval. Brick shall meet the requirements of ASTM C216 Grade SW unless otherwise specified.

.2 Other Materials: all other materials not specifically described but required for a complete and proper installation of masonry, shall be as selected by the Contractor subject to approval by the Consultant.

2.2 Accessories

.1 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.

.2 Packing Insulation: loose glass fibre insulation or mineral wool with minimum density of 17.6 kg/m³.

PART 3 EXECUTION

3.1 General

.1 Do masonry work in accordance with CAN3-A371 except where specified otherwise.

.2 A competent masonry foreman shall supervise and direct the work and only skilled masons shall execute the work of this Section. The workmanship in construction of exposed masonry walls shall be of highest calibre and first class in all respects.

.3 Build masonry plumb, level and true to line, with vertical joints in alignment.

.4 Layout coursing and bond to achieve correct coursing heights and continuity of bond above and below openings, with minimum cutting.

.5 Chipped, cracked or stained, and unsatisfactory material or workmanship of all masonry work shall be replaced with undamaged units.

3.2 Exterior Walls

.1 Mixing and Blending: mix masonry units within each pallet and with other pallets to ensure uniform blend of colour, size and texture.
.2 Jointing: allow joints to get just enough to remove excess water, then tool with round jointer to provide smooth, compressed uniformly concave joints.

.3 Bond: Match existing.

.4 Place continuous dampcourse and flashing membrane at the bottom of all walls and at shelf angles and over all openings. Lap all joints 150 mm and seal with adhesive.

.5 Jointing: allow joints to dry just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints where concave joints are indicated.

3.3 Grouting

.1 Grout masonry in accordance with CAN3-S304 and as indicated to match existing brick unit size, texture, and tooling.

3.4 Protection

.1 Protect masonry units from damage resulting from subsequent construction operations.

.2 Use protection materials and methods which will not stain or damage masonry units.

.3 Remove protection materials upon Substantial Performance, or when risk of damage is no longer present.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 01 00.91 Cleaning and Restoration of Masonry in Historic Structures
.2 Section 04 01 20 Masonry Procedures, Historic Restoration
.3 Section 04 01 20.19 Unit Masonry Restoration
.4 Section 04 05 13.91 Masonry Restoration Mortaring
.5 Section 04 05 19 Masonry Anchorage and Reinforcing

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C5-109, Standard Specification for Quicklime for Structural Purposes
  .2 ASTM C207-06(2011) Standard Specification for Hydrated Lime for Masonry Purposes
  .3 ASTM C144-11 Standard Specification for Aggregate for Masonry Mortar
.2 Canadian Standards Association (CSA)
  .1 CAN/CSA-A5, Portland Cement.
  .2 CAN/CSA-A8, Masonry Cement.
  .3 CSA A82.56 Aggregate for Masonry Mortar.
  .4 CSA A179 Mortar and Grout for Unit Masonry.
  .5 CSA S304.1-04 (R2010) - Design of Masonry Structures
  .6 CAN/CSA-A179-04 (R2014) - Mortar and Grout for Unit Masonry
.3 Ontario Building Code
.4 The Standards & Guidelines for the Conservation of Historic Places in Canada

1.4 Submittals

.1 Refer to Section 04 01 00.91

.2 Submit mortar mixes and test results.

1.5 Quality Control

.1 Mortar compressive strength and mortar mixes shall be determined by the Consultant after laboratory testing of existing mortar and masonry samples. In no case will mortar compressive strength exceed the compressive strength of those masonry components which it supports.

.2 If the mortar fails to meet the 7 day compressive strength requirements, but meets the 28 day compressive strength requirement, it is to be accepted. If the mortar fails to meet the 7 day compressive strength requirement, but its strength at 7 days exceeds two thirds of the value required for the 7 day strength, the Contractor may elect to continue work at his own risk whilst awaiting the results of the 28 day tests, or to take down the work affected.

1.6 Quality Assurance

.1 Restoration Specialist: masonry contractor shall demonstrate special competency and training in

historic restoration.

.2 Mock-Ups: Refer to Section 04 01 00.91

.3 Cleaning: Prior to the start of any cleaning work, demonstrate on a sample area of the building of approximately 25 square feet where directed by the Consultant or the Owner, materials and methods to be used for cleaning each type of masonry surface for approval.

1.7 Shipping, Handling and Storage

.1 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

PART 2 PRODUCTS

2.1 Materials

.1 The replacement mortar shall coexist with the old in a sympathetic, supportive and, if necessary, sacrificial capacity. The replacement mortar shall have greater vapour permeability and be softer (measured in compressive strength) than the masonry units. The replacement mortar shall be as vapour permeable, and as soft, or softer, (measured in compressive strength) than the existing historic mortar. Measure water vapour transmission in accordance with ASTM E96/E96M.
   .1 Matching
      .1 Take test specimens of existing mortar from a sound and intact representative portion of the structure, at locations indicated by the Consultant. The replacement mortar match the original existing material in colour, texture and tooling. The sand shall match the sand in the original existing mortar by colour, shape and particle size distribution as defined using ASTM C144; ASTM E11 sieves. Use of admixtures is subject to approval.
   .2 Binder Content of Historic Mortar
      .1 Identify performance characteristics of the replacement mortar carefully based upon evaluation of the existing historic mortar. Each binder type or mixture of mortar shall have a cement, lime, or combination thereof consistent with the original existing mortar content in order to provide uniform durability, weathering characteristics, and the same, or better, life-cycle performance expectations.

.2 Water: Potable, free from contamination and deleterious amounts of acids, alkalies or organic material.

.3 Lime: Processed slaked quicklime conforming to CSA A82.42 and ASTM C5.

.4 Hydrated Lime: To ASTM C207.

.5 Portland Cement: To CAN A5-M.

.6 Masonry Cement: To CAN A8-M.

.7 Aggregate: Well graded washed sand to CSA A82-56. Aggregate shall be of texture and colour determined by the Consultant to suit site conditions and to match original if necessary, based on analysis of existing.

.8 Calcium chloride shall not be used for any purpose.

PART 3 EXECUTION

3.1 Preparation

.1 Slake processed lime in water for not less than 24 hours or soak hydrated lime in water for not less than 12 hours.

.2 Take precautions as specified in Section 04 05 13.91 when slaking lime.

3.2 Mortar Mix

.1 Mortar mixes shall be as determined based on site and laboratory analysis of existing mortar and masonry materials.

.2 Mix shall match the original as closely as possible in texture and colour.

.3 More than one mix may be required to suit various materials, jointing and conditions.

3.3 Mixing

.1 Mix mortar under strict supervision and in strict accordance with approved mix design. Substitution of any material will not be permitted.

.2 Mix only sufficient mortar that can be used within 2 hours. Discard mortar not used within 2 hours.

.3 Mortars must be mixed a total of at least 10 minutes before using to improve workability, increase air entrainment and plasticity, and ensure thorough mixing.

.4 Record amounts of water required and added to each batch.

.5 Clean all mixing boards and mechanical mixing machines between batches.

.6 Do not use re-tempered mortars.

3.4 Field Quality Control

.1 Follow proper batching procedure.

.2 Use batching box.

.3 Monitor mixing time.

.4 Take samples of each batch for testing.

3.5 Cleaning

.1 Remove droppings and splashings using clean sponge and water.

.2 Clean masonry using soft natural bristle brush and low pressure clean water.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 01 00.91 Cleaning and Restoration of Masonry in Historic Structures
.2 Section 04 01 20 Masonry Procedures, Historic Restoration
.3 Section 04 01 20.19 Unit Masonry Restoration
.4 Section 04 05 13.13 Masonry Restoration, Historic Mortars
.5 Section 04 05 19 Masonry Anchorage and Reinforcing

1.3 References

.1 Canadian Standards Association (CSA)
  .1 CSA S304.1-04 (R2010) - Design of Masonry Structures
  .2 CAN/CSA-A179-04 (R2014) - Mortar and Grout for Unit Masonry
.2 Ontario Building Code
.3 The Standards & Guidelines for the Conservation of Historic Places in Canada

PART 2 PRODUCTS

2.1 Materials

.1 Use only products as specified in Section 04 05 13.13

.2 Calcium chloride shall not be used for any purpose.

PART 3 EXECUTION

3.1 Preparation of Lime Putty

.1 Estimate the quantity of lime putty required to complete the work.

.2 Allow at least two weeks' storage time for slaked lime putty before it is used.

3.2 Slaked Quicklime

.1 Prepare slaked quicklime by filling a tank with approximately 300 mm of hot water. Add lumps of fresh quicklime to the water, taking care that the water covers the lime. Stir and hoe the mass while the lime splits and breaks up with the generation of heat and carbon dioxide gas. Add further water and quicklime until a sufficient quantity is produced. The reaction between the lime and water may be fierce, and slaking operations must be carried out under strictly controlled conditions. Protective clothing, especially safety goggles and gloves, must be worn.

.2 The slaking operation produces a thick, creamy liquid which must be run through a 3.0 mm mesh screen into plastic-lined drums when cool. Store putty under 4" of water and leave to cure, for at least two weeks, undisturbed. Allow the consistency of the putty to develop and the water over it to clear.

.3 The drums should be dated and labeled, and the tops sealed.

3.3 Hydrated Lime

.1 Putty can be made from hydrated mason's lime by adding dry bagged hydrated lime to water. The mass is stirred and hoed to form a thick cream. Allow to stand at least 24 hours before use - preferably longer.

3.4 Preparation of Roughage

.1 If the Contractor desires, the lime and aggregate may be pre-mixed to produce roughage or coarse-stuff. Seal compound from air and keep from freezing.

.2 The sand and lime should be accurately proportioned using measuring boxes constructed to contain the exact volume of each ingredient required to make one batch. These materials shall be thoroughly mixed in a mechanical mixer for about ten minutes, then stored in plastic-lined drums and sealed until required.

.3 When required for use the correct portion of gauging cement should be added, and the mix worked up as specified and used immediately.

.4 As the strength and colour of even slightly different mixes varies dramatically, accurate portioning is a strict requirement of this specification.

3.5 Cement Gauging of Mortars

.1 The addition of hydraulic cements to lime and aggregate mixes must be done immediately before the use of the mortar.

.2 All mortar must be used within two hours of gauging; do not re-temper mortars after this time has elapsed.

.3 All batching is to be done with wooden boxes or plastic pails of known volume to ensure standardization and conformity of measurement.

.4 Shovel measurement of materials is not permitted. Boxes shall be of such a size that a batch sufficient for one mixer load is measured out.

.5 Initially, mortars shall be mixed for five minutes without cement or the addition of water. Carefully add small amounts of water to produce a mortar that is just wet enough to hang on a trowel. Water content in excess of 5% will not be permitted.

.6 Cement shall be added and mixed for about two minutes before use.

.7 The amount of water required shall be recorded and added at the start of mixing for future batches.

.8 Mortars must be mixed a total of at least 10 minutes before using to improve workability, increase air entrainment and plasticity, and ensure thorough mixing.

.9 All mixing boards and mechanical mixing machines must be cleaned between batches.

.10 Strict control must be exercised so that masons refrain from using too wet a mix. Only water lost through evaporation may be replaced at the mortar-board by the mason.

3.6 Mix Formulae

.1 The following mix formulae are generally acceptable for use in this project subject to approval of samples and testing of existing masonry materials for compressive strength and compatibility. Final mix formulae for pointing shall be determined by the Consultant.

.2 For moderately durable masonry materials including bricks, use Mortar Mix comprised of 1 part cement, 3 parts lime and 10 - 12 parts aggregate.

.3 For poorly durable, masonry materials including soft bricks and friable stone, use Mortar Mix comprised of 2 parts lime and 5 parts aggregate.

3.7 Cutting Out of Deteriorated Jointing

.1 All mortar joints in existing stone are to be cut out, to the full height of the joint and to sound original mortar, not less than 25 mm deep.

.2 All seriously deteriorated joints in brick work are to be cut out to the full height of the joint and to sound, original mortar to a minimum depth of 25 mm.

.3 Fine joints (less than 3 mm) need not be raked out more than 10 mm in order to reduce the danger of chipping of masonry edges.

.4 Seriously deteriorated joints are defined as having: loose or missing mortar; excessively soft mortar; powdery or crumbling mortar; cracks that weaken the bond between units; voids; or badly stained pointing.

.5 Metal fittings such as nails, brackets, clips and the like should be removed from wall areas as cutting out proceeds.

.6 Sound adjacent joints in brick work are not to be cut out but left in their present state.

.7 Areas of jointing previously repointed using a hard cement and sand mix are to be treated as defective jointing and cut out.

3.8 Method of Cutting Out

.1 All cutting out is to be done by skilled mechanics under the direction of a competent mason experienced in this type of work.

.2 Be responsible for maintaining the stability of the structure at all times.

.3 All cutting out of joints is to be done with hammer, diamond cut blade, and chisel, unless otherwise specified herein.

.4 Joints improperly repointed with hard cement mortars may be partially cut out with power saws and grinding wheels under the following conditions:
.1 All work is to be done under the direct supervision of the foreman.

.2 Power equipment may be used only to score one cut in each joint at the centre of the joint; the cut is to be no more than one half the width of the joint, and cut to the full depth of the joint required.

.3 Final cutting out of the joints is to be made with sharp bolsters, to detach the upper and lower fragments remaining. Do not clean joints with power equipment. All finish work is to be done by hand.

.5 Great care must be taken so as not to damage masonry units adjacent to joints. Any units damaged during cutting out operations will be considered as defective and must be repaired or replaced at the Contractor's sole expense in a manner acceptable to the Consultant.

.6 Damage includes nicks, scoring, deep scratches, chipped edges or the like that are, in the opinion of the Consultant, caused by neglect or lack of proper care by the workers in carrying out the specified requirements of the contract.

.7 When cutting out is completed in each area all joints are to be brushed clean of debris and the joints blown clean with medium-pressure compressed air.

3.9 Repointing

.1 All masonry repairs must be completed before commencing repointing. Joints in repaired areas are to be raked back 25 mm and allowed to set and dry for at least 72 hours to allow shrinkage to take place.

.2 Immediately before repointing operations commence, the area to be pointed is to be thoroughly flushed with water to remove all dust and to wet the surface well until suction is controlled and the surface stays wet.

.3 Pointing is to be built up in layers not exceeding 13 mm in depth; the bottom layers must be allowed to set before subsequent layers of mortar are applied. Pack joints solidly and fill all voids.

.4 After the final layer of mortar has set the joint is to be tooled lightly to give the final required form and to match the approved sample. Do not overwork the face of the joint. Head joints must be tooled first.

.5 All masons are to use identical jointing tools.

.6 All excess mortar must be removed from the face of the masonry before it sets, and the jointing neatly finished as specified.

3.10 Cleaning

.1 Excess mortar shall be immediately removed from adjacent surfaces.

.2 As work proceeds clean all masonry with a fibre-bristle brush or plastic brush. Do not use a metal brush at any time.

.3 Wash down the completed sections of wall from top to bottom as the pointing has hardened. Allow three days for the initial hardening of the mortar.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 22 00 Concrete Unit Masonry
.2 Section 05 50 00 Metal Fabrications
.3 Section 06 10 00 Rough Carpentry

1.3 References

.1 Canadian Standards Association (CSA)
  .1 CSA-A371, Masonry Construction for Buildings.
  .2 CSA-S304.1, Masonry Design for Buildings (Limit States Design)
  .3 CSA G30.3, Cold-Drawn Steel Wire for Concrete Reinforcement.
  .4 CSA G30.12, Billet-Steel Bars for Concrete Reinforcement.
  .5 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
  .6 CSA-A23.1, Concrete Materials and Methods of Concrete Construction
.2 American Concrete Institute (ACI)
  .1 Detailing Manual
.3 Reinforcing Steel Institute of Canada (RSIC)
  .1 Reinforcing Steel Manual of Standard Practice,

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit the following samples:
  .1 Two (2) of each type of masonry reinforcing and connector specified.

.3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.4 Submit two copies of MSDS - Material Safety Data Sheets. Indicate VOC's for protective coatings and touch-up products.

.5 Shop Drawings:
  .1 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
  .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
  .3 Prepare placing drawings to minimum scale of 1:50.
  .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
  .6 Show cover to reinforcement

.7 Show location of construction joints.
.8 Prior to submission to Consultant, review all shop drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each shop drawing with the requirements of Work and Contract Documents. Contractor's review of each shop drawing with the requirements of Work and Contract Documents. Contractor's review of each shop drawing shall be indicated by stamp, date, and signature of a responsible person.
.9 At time of submission, notify Consultant in writing of any deviations in shop drawings from requirements of Contract Documents.
.10 Consultant will review and return shop drawings in accordance with an agreed schedule. Consultant's review will be for conformity to design concept and for general arrangement, and shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of Contract Documents.
.11 Make any changes in shop drawings which Consultant may require consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, Contractor shall notify Consultant in writing of any revisions other than those requested by Consultant.
.12 Do not commence fabrication of reinforcement before drawings have been reviewed and Consultant's comments incorporated on drawings issued to fabricating shop.

1.5 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.6 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 All metal components: hot dipped zinc galvanized to CSA-S304 unless otherwise indicated.

.2 Bar Reinforcement: To CSA-A371 and CSA G30.18, grade 400R, deformed billet steel bars.

.3 Wire Reinforcement: To CSA-A371 and CSA G30.3.
.1 Interior walls: hot dipped galvanized to CSA-S304
.1 4.76 mm wire diameter hot dipped galvanized to CSA-S304 for interior bearing walls.
.2 3.66 mm wire diameter bright wire finish, standard duty for interior non-bearing walls and partitions
.3 Truss Type: Blok-Trus BL-30 by Blok-Lok Ltd. for non-vertically reinforced walls
.4 Ladder Type: Blok-Trus BL-10 by Blok-Lok Ltd. for vertically reinforced walls

.4 Equivalent products as manufactured by the following manufacturer’s may be used subject to submission and acceptance by the Consultant of technical data:
.1 Dayton Superior Dur-O-Wall
.2 Hohmann and Barnard Inc.

2.2 Fabrication

.1 Fabricate reinforcing in accordance with CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.

.2 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.

.3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.

.4 Ship reinforcement clearly identified in accordance with drawings.

PART 3 EXECUTION

3.1 Installation

.1 Install masonry anchors in accordance with CSA-A370, CSA-A371, CSA-A23.1 and CSA3-S304 unless indicated otherwise.

3.2 Reinforcement

.1 Unless otherwise noted, all masonry walls shall be reinforced with joint reinforcement.

.2 Reinforcement shall be installed in the first and second bed joints, 200 mm apart immediately above lintels and below sill at openings, and in bed joints at 400 mm vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend two feet beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints. Side rods shall be lapped at least 150 mm at splices.

.3 Use prefabricated corner and tee sections for continuous reinforcement at corners and intersecting walls.

.4 Terminate reinforcement 25 mm short of each side of control joints as indicated.

.5 Vertical reinforcement shall have a minimum clearance of 13 mm from the masonry and not less than one bar diameter between bars.

.6 All block cores containing vertical reinforcing and/or anchor bolts shall be solidly filled with non-shrink grout.

.7 Place reinforcement and ties in grout spaces prior to grouting.

.8 After cleaning, close cleanouts with closures braced to resist grout pressure.

3.3 Bonding and Tying

.1 Install masonry connectors in accordance with CSA-A370, CSA-A371, CSA-A23.1 and CSA3-S304 unless indicated otherwise.

.2 Bond walls of two or more wythes using seismic connectors and ladder type reinforcement in accordance with NBC CSA-S304, CSA-A371 and as indicated.

.3 Tie masonry veneer to backing in accordance with NBC, CSA-S304, CSA-A371 and as indicated herein.

3.4 Reinforced Lintels and Bond Beams

.1 Reinforce masonry lintels and bond beams as indicated.

.2 Place and grout reinforcement in accordance with CSA-S304.

3.5 Metal Anchors

.1 Do metal anchors as indicated.

3.6 Lateral Support and Anchorage

.1 Do lateral support and anchorage in accordance with CSA-S304 and as indicated.

3.7 Control Joints

.1 Terminate reinforcement 25 mm short of each side of control joints unless otherwise indicated.

3.8 Field Bending

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars and connectors which develop cracks or splits.

3.9 Field Touch Up

.1 Touch up damaged and cut ends of galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.10 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 03 10 00	Concrete Forming and Accessories
.2	Section 03 20 00	Concrete Reinforcing
.3	Section 03 30 00	Cast-in-Place Concrete
.4	Section 04 05 19	Masonry Anchorage and Reinforcing
.5	Section 05 50 00	Metal Fabrications
.6	Section 06 10 00	Rough Carpentry
.7	Section 07 84 00	Firestopping
.8	Section 07 92 00	Joint Sealants
.9	Section 08 11 00	Metal Doors and Frames
.10	Section 09 21 16	Gypsum Board
.11	Section 09 91 23	Interior Painting

1.3 References

.1 Ontario Building Code.
.2 ASTM International, (ASTM)
  .1 ASTM C90-15 Standard Specification for Loadbearing Concrete Masonry Units
  .2 ASTM C129-14a Standard Specification for Nonloadbearing Concrete Masonry Units
  .3 ASTM C150/C150M-15 Standard Specification for Portland Cement
  .4 ASTM C207-06 (2011) Standard Specification for Hydrated Lime for Masonry Purposes.
  .5 ASTM D2240-05(2010) Standard Test Method for Rubber Property—Durometer Hardness.
  .6 ASTM D5249-10 Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.
.3 Canadian Standards Association (CSA)
  .1 CSA A23.1-09, Concrete Materials and Methods of Concrete Construction.
  .2 CSA A165 Concrete Masonry Units.
  .3 CSA A179-04 (R2009), Mortar and Grout for Unit Masonry,
  .4 CAN3-A370-04 (2009) Connectors for Masonry.
  .5 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.
  .6 CSA S304.1-04 (R2010), Masonry Design for Buildings.
.4 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Data: Submit manufacturer's printed product literature, specifications and data sheets.

.3 Submit the following samples:
  .1 Two (2) of each type of concrete masonry units specified.
  .2 Two (2) of each type of masonry accessory specified.

.4 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.

.5 Submit engineered temporary bracing design drawings for temporary support of masonry walls. Drawings shall be prepared by, and bear the seal of a Professional Engineer, licensed in the Province of Ontario.

1.5 Quality Assurance

.1 The masonry sub-contractor shall have a minimum of five (5) years of continuous documented Canadian experience in work of the type and quality shown and specified. Proof of experience shall be submitted when requested by the Consultant and shall be subject to the approval of the Consultant.

.2 Mock Up: Construct a sample panel of acoustic block units, no less than 1200 x 1200 mm, of units of each colour and size to be used in the project.

1.6 Hot Weather Requirements

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

1.7 Protection

.1 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.

.2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

1.8 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Materials shall be kept clean and dry.

.4 Deliver cement, lime and mortar ingredients with manufacturer's seal and labels intact.

.5 Cementitious material and aggregates shall be stored in accordance with the requirements of CAN A23.1-09.

.6 Exposed units which become stained or chipped, surface marked or scratched, and materials which are affected by inadequate protection shall be replaced, at no additional expense to the Consultant.

.7 Masonry units shall be delivered to site in protective film and shall be stored without contact with ground or ground water.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Masonry Units: Concrete Block: Modular, conforming to CCMPA requirements and CAN/CSA A165.1.
  .1 H/20/A/M concrete masonry units to be used at all load bearing masonry walls.
  .2 H/15/A/M concrete, masonry units, at all other locations unless noted otherwise.
  .3 Refer to drawings for Fire Resistance Ratings. Type of concrete and block to conform to Table 5.0, Fire Resistance Rating of Concrete Block in Hours, of the Canadian Concrete Masonry Producers Association Handbook.
  .4 Special shapes: provide special shapes indicated or required. Provide purpose made shapes for lintels and bond beams.
  .5 Exposed block shall all be made by one manufacturer and shall be uniform in colour, shade and texture.

.2 Masonry Reinforcement and Connectors:
  .1 Bar Reinforcement, wire reinforcement, connectors and ties: as specified in Section 04 05 19 - Masonry Anchorage and Reinforcing.

.3 Control Joint Filler: to ASTM D5249, Type 1, Round, flexible, continuous-length, nonabsorbent, nongassing, nonstaining, and nonshrinking. Extruded from a cross-linked polyethylene. Flexibile foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall.

.4 Pre-manufactured Masonry Control Joint: Pre-manufactured polyvinylchloride control joints may be used in lieu of the specified built-up type of joint.

.5 Mortar and Grout: Conforming to CAN/CSA A179.
  .1 Use same brand of material and source of aggregate for entire project.
  .2 Aggregate: CAN/CSA A179, fine grain aggregates.
  .3 Cement: normal Portland to ASTM C150/C150M-12, Type 10.
  .4 Water shall be clean, potable and free of deleterious amounts of acid, alkalies, or organic materials.
  .5 Hydrated Lime: Type ‘S’ to ASTM C207.
  .6 Type 'S' mortar shall be used for all concrete block masonry work.
  .7 Proprietary Mortar Mixes: conform to mix requirements specified
  .8 Mortar colour for concrete unit masonry work shall be grey.
  .9 Admixtures of any kind are not allowed.

.6 Grout: to CAN/CSA A179, Table 3:
  .1 Premixed, non-shrink non-metallic grout.

.7 Other Materials: all other materials not specifically described but required for a complete and proper installation of masonry, shall be as selected by the Contractor subject to approval by the Consultant

2.2 Mixes

.1 Mixing: Prepare and mix mortar materials under strict supervision, and in small batches only for immediate use.

.2 Mix proprietary mortars in strict accordance with manufacturer's instructions to produce the specified mortar types in accordance with CAN/CSA A179. Do not use re-tempered mortars.

.3 Take representative samples for testing consistency of strength and colour according to CAN/CSA A179.

2.3 Accessories

.1 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.

2.4 Fabrication

.1 Lintels in non-load-bearing walls shall be constructed with special bond or lintel block units unless shown otherwise on plans. Lintels shall bear 150 mm minimum and bearing shall be isolated with two layers of heavy asphalt coated paper.

.2 Reinforcing steel in lintels shall be 2 x 20 M bars minimum specified under Section 04 05 19 - Masonry Anchorage and Reinforcing, or as noted on drawings.

.3 Concrete fill for lintels shall be 25 MPa or as noted on the drawings. Concrete shall be as specified in Section 03 30 00.

PART 3 EXECUTION

3.1 Existing Conditions

.1 Examine work of other trades for defects or discrepancies and report same in writing to Consultant.

.2 Installation of any part of this work shall constitute acceptance of such surfaces as being satisfactory.

3.2 General

.1 Do masonry work in accordance with CAN/CSA A371 except where specified otherwise.

.2 A competent masonry foreman shall supervise and direct the work and only skilled masons shall execute the work of this Section.

.3 Coordinate work of this Section with others such as, field welding of anchors to steel work, insulation application, and the like. Prepare all items for built-in as the work proceeds, either supplied and installed by other trades or installed under this Section.

3.3 Workmanship

.1 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.2 Lay out coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

.3 Lay block with webs to align plumb over each other with thick ends of webs up. The top course of all partitions which do not pass through a ceiling or up to the underside of a roof deck shall have the open cells filled solid.

.4 Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel for flush mounted electrical outlets, grilles, pipes, conduits, leaving 3 mm maximum clearance.

.5 Fill all vertical and bed joints, including plain end faces, through the entire wall thickness solidly with mortar.

.6 Do not break bond of exposed walls where partitions intersect and if bond would show through on exposed face of walls. Bond these partitions to walls they intersect with prefabricated intersection masonry reinforcement in each course.

.7 Bond intersecting block walls in alternate courses.

.8 Terminate non load bearing walls within 20 mm of structure above unless indicated otherwise.

.9 Where walls are pierced by structural members, ducts, pipes, fill voids with mortar to within 20 mm of such members.

.10 Buttering corners of units, throwing mortar droppings into joints, deep or excessive furrowing of bed joints, is not permitted. Do not shift or tap units after mortar has taken initial set. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply.

.11 Do not wet concrete masonry before or during laying in wall.

.12 Bed and vertical joints shall be evenly and solidly filled with mortar.

.13 Provide reinforced bond beams where indicated on structural drawings.

.14 Provide vertical reinforcement as indicated on structural drawings.

3.4 Exposed Masonry

.1 Do not use chipped, cracked or stained, and otherwise damaged units or unsatisfactory material in exposed and load bearing masonry walls.

.2 Lay all joints 10 mm thick (uniform). All joints shall be full of mortar except where specifically designated to be left open.

.3 All joints shall be slightly concave. Use sufficient force to press mortar tight against masonry units on both sides of joints. Remove excess material or burrs left after jointing by means of a trowel or rubbing with burlap bag.

.4 Provide bullnose block at all exposed masonry corners.

.5 Provide stack bond coursing where indicated. All other locations shall be running bond.

3.5 Tolerances

.1 Tolerances in notes to Clause 5.3 of CAN/CSA A371 apply.

3.6 Reinforcement

.1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.7 Connectors

.1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.8 Concrete Masonry Lintels

.1 Install reinforced concrete block lintels over openings in masonry walls where steel lintels are not indicated.

.2 End bearing: not less than 200 mm.

.3 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.9 Loose Steel Lintels

.1 Install loose steel lintels. Centre over opening width.

.2 Lintels supplied under Section 05 50 00 – Metal Fabrications.

3.10 Control Joints

.1 Provide continuous joints as indicted and at spacing not to exceed 6000 mm c/c unless noted otherwise on drawings.

.2 Break vertical mortar bond with extruded neoprene gasket or building paper.

.3 Prime control joint to prevent drying out of caulking material.

3.11 Support of Loads

.1 Use 25 MPa concrete unless specified otherwise on the Drawings, where concrete fill is used in lieu of solid units.

.2 Use grout to CAN/CSA A179 where grout is used in lieu of solid units.

.3 Install building paper below voids to be filled with grout. Keep paper 25 mm back from face of units.

3.12 Lateral Support and Anchorage

.1 Do lateral support and anchorage of masonry in accordance with CSA S304.1 and as indicated.

3.13 Grouting

.1 Grout masonry in accordance with CSA S304.1 and as indicated.

3.14 Temporary Wall Bracing

.1 Design and provide all required temporary engineered wall bracing.

.2 Brace masonry walls to resist wind pressure and other lateral loads during construction period.

.3 Provide temporary bracing of masonry work during and after erection until mortar has cured and permanent lateral support is in place.

3.15 Built-ins

.1 Build in items required to be built into masonry and provided by other Sections, including bearing plates, door frames, anchor bolts, sleeves and inserts. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes and other items.

.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 voids between masonry and metal frames with masonry mortar or insulation, as indicated on drawings or as required to provide a neat finished appearance.

.4 Set wall plates on masonry in non-shrink grout in accordance with manufacturer's instructions.

.5 Do all cutting, fitting, drilling, patching and making good for other trades in masonry work.

3.16 Protection

.1 Protect masonry units from damage resulting from subsequent construction operations.

.2 Use protection materials and methods which will not stain or damage masonry units.

.3 Remove protection materials upon Substantial Performance, or when risk of damage is no longer present.

3.17 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Allow mortar droppings on unglazed concrete masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

.3 Remove mortar from concrete floor slabs and leave entire area vacuum clean.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 50 00 Metal Fabrications
.2 Section 06 10 00 Rough Carpentry

1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A653/A653M-25a Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
.2 CSA Group (CSA)
  .1 CSA S16:19 Design of Steel Structures
  .2 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members, Includes Update No. 1 (2009), Update No. 2 (2010)
  .3 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
  .4 CSA W48:23 Filler Metals and Allied Materials for Metal Arc Welding
  .5 CSA W55.3-08 Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  .6 CSA W59-18 Welded Steel Construction (Metal Arc Welding)
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 1.181-99 Ready-Mixed Organic Zinc-Rich Coating
.4 Canadian Sheet Steel Building Institute (CSSBI)
  .1 CSSBI 10M Standard for Steel Roof Deck.
  .2 CSSBI 12M Standard for Composite Steel Deck.
  .3 CSSBI SSF 16-14 Acoustic Properties of Perforated Steel Deck

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Ontario, Canada. Each submission of the shop drawings shall bear the seal of the Engineer.
  .1 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.
  .2 Indicate details of temporary shoring of steel deck.

.3 Submit design calculations if requested by Consultant.

1.5 Design Requirements

.1 Design steel deck using limit states design in accordance with CSA S136 and CSSBI 10M.

.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, and uplift as indicated.

.3 Deflection under specified live load not to exceed 1/240 of span, except that when gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.

.4 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CSA S16.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Sheet Steel: ASTM A653 minimum Grade 230 with a base steel design thickness as specified

.2 Closures: in accordance with manufacturer's recommendations.

.3 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.2 Types of Decking

.1 Deck shall conform to the depths noted on the drawings.

.2 Steel roof deck: to CSSBI 10M non-cellular, interlocking side laps.Base steel thickness, depth & profile as shown on the drawings.

PART 3 EXECUTION

3.1 General

.1 Structural steel work: in accordance with CSA S136 and CSSBI 10M.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.2 Erection

.1 Erect steel deck as indicated and in accordance with CSA S136, CSSBI 10M, CSSBI 12M and with reviewed erection drawings.

.2 Lap ends: to 50 mm minimum.

.3 Place and support reinforcing steel as indicated.

3.3 Closures

.1 Install closures in accordance with approved details.

3.4 Connections

.1 Install connections in accordance with CSSBI recommendations as indicated.

3.5 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 04 05 19 Masonry Anchorage and Reinforcing
.3 Section 04 22 00 Concrete Unit Masonry
.4 Section 06 10 00 Rough Carpentry
.5 Section 06 20 00 Finish Carpentry
.6 Section 06 40 00 Architectural Woodwork
.7 Section 09 21 23 Interior Painting

1.3 References

.1 The Ontario Building Code.
  .1 MMAH Supplementary Standard SB-8, September 14, 2012. Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders.
.2 ASTM International, (ASTM)
  .1 ASTM A53/A53M-12 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
  .2 ASTM A123/A123M-12 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
  .3 ASTM A307-10 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  .4 ASTM A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  .5 ASTM A385/A385M-15 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
  .6 ASTM A570, Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
  .7 ASTM A1008/A1008M-12 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
  .8 ASTM A1011/A1011M-12a Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
  .9 ASTM D6386-10 Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
.3 Canadian Standards Association (CSA International)
  .1 CSA G40.20-04/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .2 CSA-S16-09, Design of Steel Structures
  .3 CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  .4 CSA-W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.
  .5 CSA W48-06 (R2011), Filler Metals and Allied Materials for Metal Arc Welding
  .6 CSA W59-03 (R2008) Welded Steel Construction (Metal-Arc Welding)
.4 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 1.40-97, Anticorrosive Structural Steel Alkyd Primer
  .2 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint
  .3 CAN/CGSB 1.181-99, Ready Mixed, Organic Zinc Rich Coating.
.5 Canadian Sheet Steel Building Institute (CSSBI)

.6 Steel Structures Painting Council, Systems and Specifications Manual.
.1 CISC/CPMA 1-73a, A Quick drying One-coat Paint for Use on Structural Steel.
.2 CISC/CPMA 2-75, A Quick drying Primer for Use on Structural Steel.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings:
.1 Submit Shop and Erection Drawings for review.
.2 Verify site dimensions before proceeding with shop fabrication and to suit field conditions and field openings.
.3 Show and describe in detail all the work of this Section including large scale detail of members and materials, of connection and jointing details, and of anchorage devices, dimensions, gauges, thicknesses, description of materials, metal finishing, as well as all other pertinent data and information, including type, size and description of all fasteners and anchors.
.4 Indicate connections to building structure.
.5 Shop drawings for all metal fabrications shall be stamped and signed by a Professional Engineer registered in the Province of Ontario. Each submission of the shop drawings shall bear the seal of the Engineer.

1.5 Qualifications

.1 Work of this Section shall be executed by a firm thoroughly conversant with laws, bylaws and regulations which govern and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work, and having a minimum ten (10) years proven experience in the fabrication of high quality metal fabrications. Use workmen skilled in work of this Section.

.2 Welding shall be performed by trades persons certified by The Canadian Welding Bureau under CSA Standard W47.1.

1.6 Examination

.1 All dimensions shall be taken from the drawings and checked against the building. Be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.

.3 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.

.4 Protect architecturally exposed materials during fabrication, delivery, handling, storage and erection to prevent marring of surfaces exposed to view, by marking, bending, denting or coarse grinding.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Structural Steel Sections and Steel Plate: CSA G40.20-04/G40.21-04 (R2009), Grade 350W.

.2 Architectural and Miscellaneous Mild Steel: CSA G40.20-04/G40.21-04 (R2009), Grade 300W.

.3 Machine Bolts and Nuts: ASTM Standard A307-10 low carbon steel externally and internally threaded standard fasteners. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.

.4 Sheet Steel: ASTM A1008/A1008M-12, stretcher leveled or temper rolled.

.5 Steel Pipe: ASTM A53/A53M-12, Schedule 40, Grade B.

.6 Welding Materials: CSA W59.

.7 Welding Electrodes: CSA W48 Series.

.8 Composite Metal Deck: As specified in Section 05 31 00.

.9 Sulphur: Commercial Grade for setting of steel posts.

.10 Adhesive Anchors: Epoxy Adhesive Anchors sized to suit loading conditions, suitable for substrate.

.11 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

.12 Isolation Coating: alkali resistant bituminous paint to CAN/CGSB 1.108-M89.

.13 Gaskets: Noprene, minimum 5.00 mm thick x 25 mm wide.

2.2 Finishes

.1 Primers: All primers for metal fabrications are to be factory applied under the requirements of this Section. Refer to Finish Schedules in Section 09 91 23 for types of primers required for each application.

.2 Pre Paint Finish: For galvanized surfaces to be exposed and finish painted, to ASTM D6386–10.

.3 Galvanizing: All steel specified to be galvanized and left exposed, to ASTM A385.

.4 Galvanizing: All steel specified to be galvanized except above, CAN/CSA G164-M92 (R2003), or ASTM A123, zinc (Hot-Galvanized) coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips. Galvanized after all welding and grinding complete. No welding or grinding of galvanized products allowed.

.5 Zinc Rich Primer: zinc rich, organic, ready mix to CAN/CGSB 1.181-92. Low VOC type.

.6 Stainless steel shall be grade and type designated below for each form required:
.1 Plate: ASTM A264, Type 316
.2 Bar Stock: ASTM A276, Type 316
.3 Tubing: ASTM A511, Type 316
.4 Pipe: ASTM A312, Type 316
.5 Sheet: ASTM A167, Type 316
.6 Tubing: ASTM A269, Type 316
.7 Bolts: ASTM A593, Type 316
.8 Nuts: ASTM A594, Type 316

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 General
.1 Fabricate to reviewed shop drawings and in general to details, sizes and materials indicated on drawings and specified herein.
.2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
.3 Fabricate work complete with all components required for anchoring; bolting or welding to structural frame; standing free or resting in frames or sockets; in a safe and sure manner.
.4 Where possible fit and shop assemble various sections of the work and deliver to site in largest practicable sections. Where shop fabricating is not possible make trial assembly in shop.
.5 Ensure exposed welds are continuous for length of each joint.
.6 Grind and fill all welds after inspection and acceptance and leave ready for prime painting.
.7 Fill all open joints, depressions, seams with metallic paste filler or by continuous brazing or welding and grind smooth to true sharp arises and profiles.
.8 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings.
.9 Supply all fastenings, anchors, accessories required for fabrication and erection of work of this Section. Such items occurring on or in an exterior wall or slab shall be hot dip galvanized. Make thread dimensions such that nuts and bolts will fit without re-threading or chasing threads.

.2 Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless otherwise indicated.

.3 Welding shall be done by the shielded metal arc method in accordance with the requirements CSA W59. Welding operators shall be currently certified under CSA W47.1 for the work they are performing.

.4 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two (2) or more layers, each layer shall be cleaned before the next layer is deposited. Care shall be taken to minimize stresses due to heat expansion, contraction and distortion by using proper sequence in welding and by approved methods.

.5 Appearance, quality of welds made, methods of correcting defective work shall be in accordance with CSA W59.

3.2 Shop Painting

.1 Cleaning Steel:
  .1 Clean steel, whether it is to be painted or not, to the degree required by CISC/CPMA 1-73a, except as specified below.
  .2 Prepare galvanized items scheduled to be painted in accordance with the requirements of Section 09 91 23, and ASTM D6386-10.
  .3 Steel to receive a shop or field paint finish shall be cleaned in accordance with Sections 09 91 23 or SSPC SP6, whichever produces a surface which has less rust and mill scale.
  .4 Clean steel which is specified to be painted to CISC/CPMA 2-75 in accordance with that Standard.
  .5 Clean steel which is specified to receive an organic zinc-filled epoxy primer, or zinc-rich paint, or inorganic zinc primer, in accordance with SSPC-SP 6, Commercial Blast Cleaning.
  .6 Clean welds by wire brushing and wash down with clean water, to remove the chemical residues left by the electrodes, prior to painting.

.2 The following surfaces shall not be painted:
  .1 Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least two inches on all sides of the joint, to ensure proper fusion of the metal.
  .2 The contact surfaces of friction type connections assembled by high strength bolts.
  .3 Portions of steel members which are to be encased in or in contact with concrete or masonry.
  .4 Galvanized items not specifically indicated to be painted.

.3 Preparation and priming of all metal work which will be exposed to view and which is scheduled to be finish painted, shall be in accordance with the requirements of Section 09 91 23.

.4 All other concealed or unpainted ferrous metal work shall be given one prime paint coat type CGSB 1.40 and in accordance with CISC/CPMA 2-75. Work paint into all corners and all joints. Metal parts in contact shall be primed before shop assembly. Priming damaged during erection or through lack of protection shall be cleaned and touched up.

.5 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7^{o}C.

.6 Metals in contact with other dissimilar metals, concrete or masonry materials shall be insulated or separated from one another to prevent corrosion, staining or electrolysis by use of bituminous paint.

3.3 Galvanizing

.1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CAN/CSA G164-M92 (R2003) or A123/A123M-12.

.2 Galvanizing of architecturally exposed steel shall be completed by a company recognized in the application of High Quality galvanized finishes and in accordance with ASTM A385.

.3 Prepare metals to be galvanized in accordance with requirements of ASTM D6386.

.4 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CAN/CSA G164-M92 (R2003) or ASTM A153/A153M-09.

.5 Coating Requirements:
.1 Weight: the weight of the galvanized coating shall conform to Table 1 of CAN/CSA G164-M92 (R2003), or paragraph 6.1 of A123/A123M-12 and Table 1 of ASTM A153/A153M-09 (as appropriate).
.2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article. The integrity of the coating shall be determined by visual inspection and coating thickness measurements.
.3 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.4 Angle Lintels

.1 Provide all loose steel angle lintels required to support openings and recesses in masonry walls, whether indicated on the drawings or not. Refer to Architectural, Structural and Mechanical drawings for locations of openings. Lintels shall be as scheduled on the Structural drawings.

.2 Steel angles: CAN3 G40.21, Grade 300W, sizes indicated for openings. Provide 150 mm minimum bearing at ends unless otherwise indicated.

.3 Weld or bolt back-to-back angles to profiles as indicated.

.4 Supply for installation by Sections 04 22 00 and 04 27 00.

.5 Lintels shall be prime painted unless otherwise indicated.

3.5 Vanity Support Brackets

.1 Provide supports to vanities and shelves where indicated, constructed of 3.0 mm steel plate with 38 mm wide horizontal and vertical legs formed to profile indicated. Locate supports at end of vanity, as detailed.

.2 Finish: Shop coat primer.

3.6 Shelf Support Brackets

.1 Provide steel angle and steel post bench support framing and anchors as detailed. All rough edges to be ground smooth.

.2 Predrill bench support assemblies for anchor bolts and screws.

.3 Finish: Shop coat primer.

3.7 Installation

.1 Supervise the setting of bases, anchor bolts, and other steel to concrete connections. Cutting of base plates to accommodate anchor bolts is cause for rejection of base plates.

.2 Provide all bracing and shoring required to support the work of this Section during installation.

.3 Work shall be fabricated and erected square, plumb and true, straight, level and accurately fitted to size detailed on reviewed Shop Drawings. All joints shall be welded unless otherwise indicated. Exposed welds shall be ground smooth and/or flush. Exposed work shall be finished smooth and even, close joints and neat connections. Exposed welds continuous for full length of joints.

.4 Where anchors or fastenings, sleeves, have to be built in by other trades, supply all necessary templates, instructions and supervision to ensure satisfactory installation.

.5 Do all drilling, cutting and fitting necessary to attach this work to adjoining work and make it complete.

.6 Provide all components required for anchoring. Make anchoring in concealed manner where possible. Exposed anchors shall be approved by the Consultant, shall be neat, and of the same material, colour, texture and finish of base metal on which they occur. Exposed fastenings shall be evenly spaced.

.7 Securely anchor components in place. Unless otherwise indicated, anchor components as follows:
- .1 To concrete and solid masonry with expansion or epoxy adhesive type anchors.
- .2 To hollow construction with toggle bolts.
- .3 To thin metal with screws or bolts.
- .4 To thick metal with bolts or by welding.
- .5 Fill space between railing members and sleeves with non-shrink grout.

.8 Grind all field welds smooth.

.9 Touch up shop coat of prime paint where damaged by field erection.

.10 Touch up galvanized finishes with zinc rich paint.

3.8 Schedule

.1 General:
- .1 Supply and install all metal fabrications indicated on Drawings, and not included in the work of other Sections.
- .2 Coordinate and sequence the work to ensure timely delivery to the site, of all items to be built in.
- .3 Where items are required to be built into masonry, concrete or other work supply such items to respective Sections with all anchors and accessories for building in.
- .4 All items shall be of sizes and as detailed on drawings.
- .5 Coordinate with Section 09 91 13 for preparation of exposed metal items required to have finish coatings applied in the field.
- .6 Review all coordination drawings prior to installation of materials, to ensure that no interferences with the work of other Sections will occur.

3.9 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 30 00 Cast-In-Place Concrete
.3 Section 04 22 00 Concrete Unit Masonry
.4 Section 05 50 00 Metal Fabrications
.5 Section 06 20 00 Finish Carpentry
.6 Section 06 40 00 Architectural Woodwork
.7 Section 08 11 00 Metal Doors and Frames

1.3 References

.1 Canadian Standards Association (CSA)
  .1 CSA C22.1-12 Canadian Electrical Code
  .2 CSA-080-M Wood Preservation
  .3 CSA-080.1 Preservative Treatment of all Timber Products by Pressure Processes.
  .4 CSA 080.9 Preservative Treatment of Plywood by Pressure Processes.
  .5 CSA 086.1 Engineering Design in Wood (Limit States Design).
  .6 CSA 0121-M Douglas Fir Plywood.
  .7 CSA 0141 Softwood Lumber.
  .8 CSA 0151-M Canadian Softwood Plywood
  .9 CAN3-0437.0-M85 Waferboard and Strandboard
  .10 CSA B111 Wire Nails, Spikes and Staples.
  .11 CSA G164 Hot Dip Galvanizing of Irregularly Shaped Articles.
.2 Canadian General Services Board (CGSB)
  .1 CAN/CGSB 71.26 Adhesive for Field Glueing Plywood to Lumber Framing for Floor Systems.
.3 Underwriters Laboratories Canada (ULC)
  .1 CAN/ULC-S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.4 National Lumber Grading Authority (NGLA)
  .1 Standard Grading Rules for Canadian Lumber, Latest Edition.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.5 Quality Assurance

.1 Sawn lumber shall be identified by the grade stamp of an association or independent grading agency certified by the Canadian Lumber Standards Accreditation Board.

.2 Plywood identification shall be by grade mark in accordance with applicable CSA Standards.

.3 Pressure treated and fire retardant treated materials shall conform to CAN/CSA-080.1.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Materials shall not be delivered before they are required for proper conduct of the work.

.3 Protect materials, under cover, both in transit and on the site.

.4 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.

.5 Protect work from damage during storage, handling, installation and until the building is turned over to the Owner. Make good damage and loss without additional expense to the Owner.

.6 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.

.7 Deliver anchor bolts for setting into concrete foundation walls and masonry walls by others.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Material shall be Grade Stamped.

.2 Construction Lumber: To CAN/CSA 0141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
   .1 Nailing strips, furring and strapping: No. 4 S-P-F.
   .2 Fitment framing: No. 1 S-P-F.
   .3 Glue end jointed (finger jointed) material is not acceptable.

.3 Panel Materials: Type, grade and thickness as specified in accordance with the following standards:
   .1 Canadian Softwood Plywood: to CSA 0151-M, standard construction, good one or both sides as required, thickness as shown or specified.
   .2 Douglas Fir Plywood: to CSA 0121-M, standard construction, good one side, thickness as shown on the drawings.
   .3 Poplar Plywood: to CSA 0153, standard construction.
   .4 Plywood used for exposed interior work shall have select grade veneer, one or both faces where exposed, with fire retardant finish. Fire retardant shall be in accordance with CAN/CSA-080.1, and all treated materials shall bear a ULC approval stamp.
   .5 Mat formed structural panel board (oriented strand board): to CAN3-0437.0, square edge, 12.7 mm thickness.

.4 Rough Hardware: Nails, screws, anchors and special fastening devices required for the erection of rough carpentry shall be galvanized and conform to CSA B111. Use common spiral nails and spiral spikes except where indicated otherwise. Use hot dip galvanized finished steel for exposed exterior work, highly humid interior areas and for pressure preservative and fire retardant treated lumber.

.5 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.

.6 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.7 Gate Hardware: Hinges, latches, gate frames and cane bolts: Hot dipped galvanized, heavy duty as indicated on the drawings and as required. Hinges tested to 1,360 kg. Gate frames shall be welded tubular steel as detailed. Provide adjustable anti-sag truss cable braces and turnbuckles.

.8 Wood Preservative to CAN/CSA-080-M.

.9 Adhesive: contractor's gun grade cartridge loaded wood adhesive, general purpose, to CSA 0112 Series and CAN/CGSB-71.26.

.10 Vapour Retardant: 0.152 mm polyethylene film to CAN/CGSB 51.34 Type 1.

.11 Galvanizing: to CAN/CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.

.12 Sealant: As specified in Section 07 92 00.

PART 3 EXECUTION

3.1 Installation

.1 Workmanship
  .1 Execute work using skilled mechanics according to best practice, as specified herein and indicated on drawings.
  .2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.

.2 Rough Hardware
  .1 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.
  .2 Fasten rough hardware; to hollow masonry units with adequate size toggle bolts; to solid masonry or concrete surfaces with expansion shields and lag screws. Where screws are required, use lead or inorganic fibre plugs. Wood or organic plugs are not permitted. Do not ramset fastenings into concrete floor or concrete block or structural steel sections.

.3 Blocking:
  .1 Provide solid wood or plywood backing to walls to support cabinetwork, vanities, accessories, specialty items and the like. Install blocking continuous between metal studs and of sufficient height to support fitments.
  .2 Provide solid wood blocking, shims and nailers as required to provide substrate for window stools.

.3 Provide wood strapping and blocking where required to support fitments, equipment, window blinds, projection screens, and the like.

.4 Provide wood strapping lagged to walls and as required to support metal lockers. Coordinate with Section 10 51 13.

.5 Provide continuous wood blocking as required and where detailed in walls and partitions at door, window and louvre jambs. Blocking in exterior cavity walls shall be pressure treated.

.4 Electrical Equipment Backboards: provide fire rated plywood backboards for mounting electrical equipment and data/communications equipment. Use fire labelled 19 mm thick fir face veneer fire retardant softwood plywood or as required by the Ontario Building Code and the Electrical Code, on 19 mm x 38 mm furring around perimeter and at maximum of 305 mm intermediate spacing. Plywood shall be painted with two coats of non-conductive, white in colour, fire retardant paint. All joints screw and nail holes are to be caulked and / or covered.

3.2 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 21 13 Building Insulation
.4 Section 07 92 00 Joint Sealants
.5 Section 08 50 00 Aluminum Doors, Windows and Screens
.6 Section 09 21 16 Gypsum Board

1.3 References

.1 The National Building Code of Canada.
.2 ASTM International, (ASTM)
  .1 ASTM D412-06 ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
  .2 ASTM D4541-09e1, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
  .3 ASTM E330-02 (2010), Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls, by Uniform Static Air Pressure Difference.
  .4 ASTM E783-02 (2010), Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
  .5 ASTM E1186-03 (2009), Standard Practices for Air Leakage Site Detection in Building Envelope and Air Retarder Systems.
  .6 ASTM D624-00 (2012) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
.3 Canadian General Specifications Board (CGSB)
  .1 CGSB 37-GP-56M, Membrane, Modified, Bituminous, Prefabricated and Reinforced for Roofing.
.4 South Coast Air Quality Management District, California State (SCAQMD)
  .1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit WHMIS MSDS - Material Safety Data Sheets.

.4 Submit manufacturer’s complete set of standard details for air barriers.

.5 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 Performance Requirements

.1 Provide continuity of air/vapour barrier materials and assemblies in conjunction with materials described in other Sections.

1.6 Sequencing

.1 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Clean spills and leave area as it was prior to spill.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

.1 Warrant air barrier materials against defects in manufacture and workmanship for a period of two (2) years following Substantial Performance.

PART 2 PRODUCTS

2.1 Materials

.1 Materials: as required to achieve specified performance criteria; meeting specified reference standards and functionally compatible with adjacent materials and components.

.2 Air/vapour barrier membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

2.2 Membranes

.1 Self-adhered air/vapour barrier membrane shall SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, and having the following physical properties:
  .1 Thickness: 1.0 mm (40 mils) min.
  .2 Air leakage: <0.01 L/s.m² @ 75 Pa to ASTM E283-91,
  .3 Vapour permeance: 1.6 ng/Pa.m².s (0.03 perms) to ASTM E96,
  .4 Low temperature flexibility: -30 degrees C to CGSB 37-GP-56M,
  .5 Elongation: 200% to ASTM D412-modifed.

.2 Acceptable Products:
  .1 Blueskin SA by Monsey-Bakor Inc.
  .2 Perm-A-Barrier by W.R. Grace & Co.
  .3 Air Shield by W.R. Meadows

2.3 Adhesive and Primers

.1 As recommended by manufacturer.

2.4 Mastics & Termination Sealants

.1 As recommended by manufacturer.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 General

.1 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

3.3 Examination

.1 Examine all surfaces to ensure conformance to the manufacturer's recommended surface conditions.

3.4 Preparation

.1 Prepare substrate surfaces in accordance with air/vapour barrier material manufacturer's instructions.

.2 All surfaces which are to receive flexible air barrier must be smooth, clean, dry, frost-free and in sound condition. All moisture, frost, grease, oils, loose mortar, dust, or other foreign materials which may impede the adhesion of the air barrier must be removed.

.3 New mortar must be cured 14 days and must be dry before air barrier membrane is applied.

.4 Concrete must be cured 28 days and dry before air barrier membrane is applied.

.5 Remove any and all sharp protrusions and repair any defects such as spalled or loose aggregate areas.

.6 Do not proceed with air barrier application until all substrate defects are repaired.

3.5 Installation

.1 Install air barrier materials in accordance with manufacturer's instructions.

.2 Install air barrier membrane continuous over all masonry wall surfaces and gypsum sheathing surfaces prior to application of insulation.

.3 Prime surfaces and apply membrane in strict accordance with manufacturer's printed directions.

.4 Primed surfaces not covered by air barrier membrane during the same working day must be reprimed.

.5 Apply membrane by heating the surface in contact with the substrate with a trigger-activated propane torch, type as recommended by the manufacturer.

.6 Cut sheet membrane into manageable sizes, position membrane for alignment prior to removing protective film.

.7 At all exterior window openings, apply membrane around perimeter and return inside window openings. Seal with tape. Provide continuous seal with existing membrane.

.8 At door openings where required, apply membrane to create positive seal between wall substrate and hollow metal door frame. Seal with tape.

3.6 Inspection and Repair

.1 Inspect membrane thoroughly before covering and make any corrections to punctures, tears, voids and other obvious defects which would impede the membrane from performing as intended.

.2 Restrict construction traffic and equipment movement near the completed air barrier to only essentially related trades. For any other trades continuing to work near the completed air barrier, appropriate protection shall be provided.

.3 Notify Consultant when sections of work are complete so as to allow for review prior to installation of insulation.

3.7 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.8 Protection of Finished Work

.1 Protect finished work in accordance with Section 01 61 00 - Common Product Requirements.

.2 Do not permit adjacent work to damage work of this Section.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 92 00 Joint Sealants
.2 Section 08 50 00 Aluminum Doors, Windows and Screens
.3 Section 08 91 00 Louvres

1.3 References

.1 The Ontario Building Code.
.2 ASTM International (ASTM):
  .1 ASTM A446 - 76(1981)e1 Standard Specification for Steel Sheet, Zinc Coated (Galvanized) By The Hot Dip Process, Structural (Physical) Quality
  .2 ASTM A653/A653M-13 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .3 ASTM D523-14 Standard Test Method for Specular Gloss
.3 Canadian Standards Association (CSA):
  .1 CSA B111, Wire Nails, Spikes and Staples.
.4 Canadian General Services Board (CGSB):
  .1 CAN/CGSB 1.108-M, Bituminous Solvent Type Paint.
  .2 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.
  .3 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.
.5 Canadian Sheet Steel Building Institute (CSSBI):
  .1 CSSBI B16-94 Prefinished Sheet Steel for Building Construction.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit duplicate 300 x 300 mm samples of each type of sheet metal material, colour and finish when requested by the Consultant.

.3 Submit WHMIS Material Safety Data Sheets for all products intended to be used, including adhesives and sealants.

1.5 Design and Performance Requirements

.1 Appearance: neatly and evenly lay out and install components. Exposed fastening devices not permitted.

.2 Effects of Wind: resist positive and negative wind pressures without detrimental effects.

.3 Water Control: prevent passage of water.

.4 Thermal Movement: accommodate expansion and contraction of component parts without buckling, failure of joints, undue stress on fasteners and other detrimental effects.

.5 Compatibility: components shall be compatible with dissimilar metals and materials with which they are in contact or fastened to so as to prevent corrosion, staining and other detrimental effects. If required, treat or separate contact surfaces with inert and non-staining insulation material to achieve compatibility.

1.6 Quality Assurance

.1 Work of this Section shall be performed by a qualified sheet metal contractor with a minimum of 5 years of experience in the type of work required and specified. Submit proof of experience where requested by the Consultant.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Materials shall be handled and stored on the job in such a manner that no damage shall be done to the material or the structures.

.3 Materials showing evidence of improper handling and storage shall be rejected and removed from the site at no additional expense to the Owner.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

.1 Submit a warranty to repair or replace metal flashing work for a period of five (5) years from date of Substantial Performance if work of this Section does not remain watertight or free of material or workmanship defects affecting structure and appearance.

.2 Submit manufacturer’s warrantee that pre finished materials will not lose film integrity for 25 years and will not chalk or fade for 20 years following date of Substantial Performance.

PART 2 PRODUCTS

2.1 General

.1 Use materials only as specified herein and matching exactly, all approved samples.

.2 Ensure compatibility of all materials in contact with roof membrane.

2.2 Materials

.1 Sheet Metal: 24 gauge (0.61 mm) thick galvanized sheet steel, commercial quality to ASTM A446 Grade 'A' with a minimum yield stress of 230 MPA, and a working stress of 144 MPA, to CSA 136. Material shall have Z275 designation zinc coating.

.2 Prefinished material shall be colour coated with manufacturer’s standard finish system equivalent to VicWest Colourite HMP with 100% ceramic colour pigmentation, minimum dry film thickness of 1.0 ± 0.2 mils (ASTM D1005). This Section shall supply all metal flashing for all applications whether shown or not, and as necessary for the complete installation.

.1 Colour for all sheet metal flashing and trim shall be as selected by the Consultant from full range of manufacturer's standard colours.
.2 Up to three colours may be selected.

.3 Continuous hook on strips and metal bellows: 22 gauge (0.65 mm) galvanized sheet steel, zinc coating designation ZF275.

.4 Isolation Coating: Alkali resistant exterior bituminous paint to CAN/CGSB 1.108-M.

.5 Plastic Cement: To CAN/CGSB 37.5.

.6 Nails, Bolts, Screws and Other Fastenings: same metal finish as sheet metal being used to CSA B111. The size of fastenings shall suit the applicable conditions.

.7 Underlay: No. 15 perforated asphalt felt to CSA A123.3-M or dry sheathing, breather type, to CAN/CGSB-51.32

.8 Cleats: Of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

PART 3 EXECUTION

3.1 General

.1 Install sheet metal work in accordance with CRCA specifications and as detailed.

.2 Use concealed fastenings except where approved before installation.

3.2 Fabrication

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA specifications and as indicated.

.2 Form pieces in 8-0" maximum lengths.

.3 Hem exposed edges on underside ½". Mitre and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating (two coats) to metal surfaces to be in contact with concrete or mortar or dissimilar metals.

.6 Install underlay under sheet metal in accordance with CRCA "FL" series details. Lap joints 4".

.7 All seams shall be of the "slip lock type" that permit adequate movement without resulting in deformation or loosening of metal flashings. Lapped joints or exposed raw edges will not be accepted. Exposed edges shall be "double back" at least ½". At eaves and parapets, metal shall be hooked over continuous starter strips minimum 1 gauge thicker than the metal used for flashing. Secure starter strips at 12" on centre or closer as required.

.8 Secure metal flashings in reglets at 2-0” centres and further secure metal to vertical surfaces at locks as required.

.9 All flashings shall be installed in perfectly straight lines. Irregular or badly fitted work will not be accepted. Exposed fastenings will only be permitted where concealed fastening is not possible. Provide neoprene washers for exposed fasteners.

.10 Fabricate scuppers as detailed and in accordance with CRCA standards.

.11 Imperfections in metal flashing work such as holes, dents, creases, or oil-canning will not be accepted.

3.3 Caulking of Flashings

.1 Sealants shall be as specified in Section 07 92 00.

.2 Caulk all joints in flashing.

.3 Dissimilar metals in contact, or metals in contact with adjacent surfaces shall be separated from one another to prevent corrosion, staining, or electrolysis by use of approved methods and materials.

.4 Do caulking between metal flashing and concrete.

.5 Caulking compound shall be applied in strict accordance with the manufacturer's application instructions. Use proper surface primers where necessary.

.6 Colour of caulking compound shall be the integral colour of the abutting material.

3.4 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 04 22 00 Concrete Unit Masonry
.3 Section 06 10 00 Rough Carpentry
.4 Section 06 20 00 Finish Carpentry
.5 Section 06 40 00 Architectural Woodwork
.6 Section 07 27 13 Modified Bituminous Sheet Air Barriers
.7 Section 07 62 00 Sheet Metal Flashing and Trim
.8 Section 07 84 00 Firestopping
.9 Section 08 11 00 Hollow Metal Doors and Fames
.10 Section 08 50 00 Aluminum Doors, Windows and Screens
.11 Section 08 80 05 Glazing

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C834-14 Standard Specification for Latex Sealants
  .2 ASTM C920-14a Standard Specification for Elastomeric Joint Sealants
  .3 ASTM C1184-14 Standard Specification for Structural Silicone Sealants
  .4 ASTM C1193-13 Standard Guide for Use of Joint Sealants
  .5 ASTM C1311-14 Standard Specification for Solvent Release Sealants
.2 Canadian General Standards Board (CGSB)
  .1 CGSB 19-GP-SM, Sealing compound, one component, acrylic base, solvent curing.
  .2 CGSB 19.13-M, Sealing compound, one component, elastomeric chemical curing.
  .3 CGSB 19-GP-14M Sealing compound, one component, butyl-polyisobutylene, polymer base, solvent curing.
  .4 CGSB 19-22-M, Mildew resistant sealing compound for tubs and tile.
  .5 CGSB 19-24-M, Multi component, chemical curing sealing compound.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit product data for all sealant materials and accessories.

.3 Submit MSDS Data Sheets for review and acceptance by the Owner prior to delivery to the project site. Obtain written approval from the Owner and do not deliver any materials to the Owner’s property, prior to receipt of such approval.

1.5 Quality Assurance

.1 Installation of caulking shall be performed only by workmen thoroughly skilled and specially trained in the techniques of caulking.

.2 Caulking work shall be carried out in strict accordance with manufacturer's printed directions.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Use all means necessary to protect caulking materials before, during and after installation and to protect the installed work and materials of all other trades.

.4 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.

.5 Store all caulking materials and equipment under conditions recommended by its manufacturer.

.6 Do not use materials stored for a period exceeding the maximum recommended shelf-life of the material.

.7 Materials shall be delivered to the job in their original containers or wrapping with the manufacturer's seal and labels intact.

1.7 Environmental Considerations

.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.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work by use of approved portable supply and exhaust fans.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of three (3) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Products of the following manufacturers are approved for use subject to meeting the specifications for the particular product listed below:
  .1 Canadian General Electric
  .2 Dow Corning
  .3 Nuco Inc.
  .4 Sika Canada Limited
  .5 Tremco Manufacturing Company (Canada) Ltd.
  .6 W.R. Grace and Company.

.7 CR Laurence.

2.2 Materials

.1 Primers: Type recommended by sealant manufacturer. Low VOC type

.2 Joint Fillers:
- .1 General: Compatible with primers and sealants, outsized 30 to 50%.
- .2 Vertical Joints: Polyethylene, Urethane, Neoprene or Vinyl:
  - .1 Extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
  - .2 Sealtight-Etha Foam Backer Rod, W. R. Meadows Canada Ltd.
- .3 Horizontal Joints: Neoprene or Butyl Rubber (Horizontal Joints): Round solid rod, Shore A hardness 70.
- .4 Premoulded Joint Filler: Unifoam R1009, Goodco Limited

.3 Sealants:
- .1 All sealants shall be Low VOC Type.
- .2 For Exterior Locations: To ASTM C920-14a, two component LP polysulphide base sealant Type 2 where subjected to foot traffic and Type 1 where not subjected to foot traffic (20-35 Shore A) Class B, bearing seal of approval of Thiokol Chemical Corporation:
  - .1 DOW Corning 790/795
  - .2 Tremco Dymeric 240FC
- .3 For Interior Locations: To CAN3-11.13-M, one component polysulphide base sealant bearing seal of approval of Thiokol Chemical Corporation.
  - .1 Mono 555 - Tremco
  - .2 Vulkem 116 - Tremco
  - .3 Acrylic Latex: Siliconized acrylic latex to ASTM C834.
    - .1 Tremflex 834 - Tremco
  - .4 Mildew Resistant Sealant: Silicone to CAN/CGSB-19.22-M and ASTM C920.
  - .5 Vapour Barrier Sealant: CAN/CGSB 19.21-M.
- .4 Colour of sealants to be selected by Consultant.

.4 Bond Breaker Tape: Polyethylene bond breaker tape which will not bond to sealant.

.5 Joint Cleaner: Xylol, methylethyleketon or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

PART 3 EXECUTION

3.1 Inspection

.1 Inspect conditions and substrates upon which work of this Section is dependent. Report to Consultant in writing any defects that may jeopardize the performance of this work.

.2 Commencement of work implies acceptance of conditions.

3.2 Preparation

.1 Remove dust, paint, loose mortar and other foreign matter. Ensure joint surfaces are dry and free of frost.

.2 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

.3 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.

.4 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.5 Prepare concrete, masonry glazed and vitreous surfaces to sealant manufacturer's instructions.

.6 Examine joint sizes and conditions to achieve correct depth ratio ½ of joint width with minimum width and depth of 6 mm, maximum width 25 mm.

.7 Install joint filler to achieve correct joint depth.

.8 Where necessary to prevent staining, mask adjacent surface prior to priming and caulking.

.9 Apply bond breaker tape where required to ensure performance of sealant.

.10 Prime sides of joints when required and as recommended by sealant manufacturer to ensure performance of sealant immediately prior to caulking.

3.3 Application

.1 Apply sealants in accordance with manufacturer's instructions, in continuous beads, to provide watertight joint. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.2 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave joint.

.3 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.

.4 Apply sealant to joints between window or door frames to adjacent building components, around perimeter of every external opening, to control joints in masonry walls where shown.

.5 Caulk joints in surfaces to be painted before surfaces are painted. Where surfaces to be caulked are primed in shop before caulking, check to make sure prime paint and caulking are compatible. If they are incompatible, inform Consultant and change caulking to compatible type approved by Consultant.

3.4 Schedule

.1 Provide sealants at the following locations
- .1 Where required to protect interior from exterior air and water infiltration.
- .2 Joints between all dissimilar materials.
- .3 Construction and control joints.
- .4 Junction of masonry and other types of partitions.
- .5 At intersecting masonry wall.
- .6 Joints between gypsum board and masonry or concrete.
- .7 Joints in metal frames.
- .8 Base of metal frames at resilient flooring.

.9 Joints between window stools and adjacent surfaces.
.10 Exterior thresholds (set in 2 full beads).
.11 Joints between shelving and adjoining surfaces (mildew resistant latex, white).
.12 Joints in ceramic tile.
.13 Window frames (inside and outside).
.14 Door frames (inside and outside).
.15 Junction of toilet fixtures with walls and floors (mildew resistant).
.16 Junction between vanities and walls or backsplashes (mildew resistant).
.17 Caulk the entire perimeter of all mechanical and electrical material or piping extending through or occurring in masonry walls unless indicated to be firestopped.
.18 Other locations where caulking or sealant is required to provide a neat clean junction

3.5 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 92 00 Joint Sealants
.2 Section 08 11 00 Metal Doors and Frames
.3 Section 08 50 00 Aluminum Doors, Windows and Screens
.4 Section 08 83 00 Mirrors
.5 Section 10 28 10 Toilet and Bath Accessories

1.3 References

.1 ASTM International (ASTM).
  .1 ASTM C162-05 (2015), Standard Terminology of Glass and Glass Products.
  .2 ASTM C542-05(2017) Standard Specification for Lock-Strip Gaskets
  .3 ASTM C1048-12e1 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
  .4 ASTM C1503-08(2013) Standard Specification for Silvered Flat Glass Mirrors
  .5 ASTM D790-17 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
  .6 ASTM D1003-13 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
  .7 ASTM D1929-16 Standard Test Method for Determining Ignition Temperature of Plastics
  .8 ASTM D2240-15 Standard Test Method for Rubber Property—Durometer Hardness
  .9 ASTM E84-17 Standard Test Method for Surface Burning Characteristics of Building Materials
  .10 ASTM E330/E330M-14 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .11 ASTM E1300-16 Standard Practice for Determining Load Resistance of Glass in Buildings
.2 American National Standards Institute (ANSI).
  .1 ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
.3 National Fire Protection Association
  .1 NFPA 80 Standard for Fire Doors, Fire Windows.
.4 Canadian General Standards Board (CGSB).
  .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
  .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.
  .3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
  .4 CAN/CGSB-12.8-97, Insulating Glass Units.
  .5 CAN/CGSB-12.9-M91, Spandrel Glass.
  .6 CAN/CGSB-12.11-M90, Wired Safety Glass.
.5 Canadian Standards Association (CSA International).
  .1 CSA A440-11, NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights, Includes Update No. 1 (2014)
  .2 CSA A440.2-14/A440.3-14 Fenestration Energy Performance/User Guide to CSA A440.2-14, Fenestration Energy Performance
  .3 CSA Certification Program for Windows and Doors 2000.
.6 Consumer Product Safety Commission
  .1 CPSC 16 CFR 1201, - Safety Standard for Architectural Glazing Materials.

.7 Environmental Choice Program (ECP).

.1 CCD-045-95, Sealants and Caulking.
.8 Flat Glass Manufacturers Association (FGMA).
.1 FGMA Glazing Manual - 1997.
.9 Laminators Safety Glass Association (LSGA).
.1 LSGA Laminated Glass Design Guide 2000.
.10 Glass Association of North America (GANA)
.1 GANA Glazing Manual
.2 GANA Sealant Manual
.3 GANA Laminated Glass Design Guide
.11 South Coast Air Quality Management District, California State (SCAQMD)
.1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.3 Samples: Submit duplicate 300 x 300 mm size samples of glass and sealant material.

.4 Manufacturer's Instructions: Submit manufacturer's installation instructions.

.5 Closeout Submittals: Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 Quality Assurance

.1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association Standards Manual for glazing installation methods.

.2 Installer: Company specializing in the installation of structural glazing with five (5) years proven experience and approved by the manufacturer for installation of their products.

.3 Safety glass products shall comply with the testing requirements of CAN/CGSB-12.1-M, Type 1 for Laminated Glass and Type 2 for Tempered Glass.

.4 Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section or referenced standards.
.1 GANA Publications
.2 AAMA Publications
.3 IGMA/IGMAC Publications

.5 Provide safety glass permanently marked with the company name or logo and CAN/CGSB-12.1-M if the product meets categories 1 and 2, or mark as CAN/CGSB 12.1-M-1 if the product meets the requirements of Category 1 only.

.6 Insulating Glass products are to be permanently marked either on spacers or at least one insulating unit component with appropriate certification label of the Insulating Glass Manufacturers Alliance (IGMA) or Insulating Glass Manufacturers Association of Canada (IGMAC)

.7 Single-source fabrication responsibility: All glass fabricated for each type shall be processed and supplied by a single fabricator.

.8 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.9 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 System Description

.1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

1.7 Design Requirements

.1 Design glass, glazing channels, connections, attachments and glazing accessories to withstand loads designated by the Ontario Building Code and to accommodate all building deflections.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure of 1.2 kPa as measured in accordance with ANSI/ASTM E330.

.3 Limit glass deflection to 1/200 with full recovery of glazing materials.

.4 Glass thicknesses indicated are minimum and are for detailing only. Confirm glass thickness by analyzing project conditions, including in-service conditions and loads. Provide glass lites for various size openings in nominal thicknesses indicated but not less than required to meet performance requirements of referenced standards. Coordinate glass thicknesses with manufacturers of framing systems.

1.8 Environmental Requirements

.1 Install glazing when ambient temperature is 10^{O}C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and for 24 hours after installation of glazing compounds.

1.9 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Provide glass units with interleaving protection between lites. Keep glass and interleaving dry and store cases in clean, cool, dry areas with temperatures above the dew point. Circulation of cool, dry air in storage areas is essential. Open cases and inspect units periodically for moisture accumulation.

.4 Do not store glass in direct sunlight without an opaque protective covering over same.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten (10) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Warrant insulating glass units for ten (10) years from date of Substantial Performance against seal failure, interpane dusting, or interpane misting.

.3 Warrant low-emissivity coatings when applied to the second or third surfaces of an insulating glass unit, for ten (10) years against peeling or coating deterioration due to product failure.

.4 Warrant Laminated glass for ten (10) years against delamination and discoloration.

PART 2 PRODUCTS

2.1 Materials-Flat Glass

.1 Mirror Glass: Silvered mirror glass: to ASTM C1503, minimum 6 mm thick.
.1 Type 1B-Float glass for high humidity use. All edges ground and polished.

2.2 Insulating Glass Units

.1 Insulating Glass Units: To CAN/CGSB-12.8-M, sealed units, not less than 1” thick or as required to meet code requirements. Minimum ½” air space.
.1 Exterior Units: Insulating Glass Type 1:
.1 Overall Unit Thickness: 1”.
.2 Outboard Lite: PPG ¼” heat treated PPG Solargray.
.3 ½” air space
.4 Inboard Lite: 6mm PPG Solarban 70XL (3) on Starphire
.5 Performance: All performance data shall be calculated according to ASHRAE standard procedures and verified using the LBL “Window 4.1” program:
.1 Winter nighttime U value: 0.28
.2 Summer Daytime U value: 0.26
.3 Shading Coefficient: 0.27
.4 Solar Heat Gain Coefficient: 0.24
.5 Relative Heat Gain: 58.2
.6 LSG: 1.33
.7 Visible Light transmittance: 32%
.8 Ultraviolet transmittance: 2%
.6 Product: PPG 6 mm heat treated Solargray + ½” air + ¼” Solarban 70XL on Starphire.

2.3 Spandrel Glass

.1 Spandrel Glass: to CAN/CGSB-12.9, 8 mm thick colored glass see plans.
.1 Type 2 Heat strengthened.
.2 Class A-Float.
.3 Etching on side 2 (interior) where indicated on the drawings.
.4 50mm air space
.5 Style 1 Opacifying coating on the back pan.
.6 Insulation
.7 Aluminum interior pan
.8 Form Shawdow box

.9 Colour to be selected as shown on the drawings from custom OPACI coat colors to color match the colored glass.

2.4 Transparent Mirror Glass

.1 Shall be “Mirropane” by Pilkington, or approved equivalent.

2.5 Glazing Products

.1 Select appropriate glazing sealants, tapes, gaskets and other glazing materials of proven compatibility with other materials that they contact. These include glass products, insulating glass unit seals and glazing channel substrates under installation and service conditions, as demonstrated by testing and field experience.

.2 Setting blocks: Neoprene 80-90 Shore A durometer hardness to ASTM D 2240, to suit glazing method, glass light weight and area.

.3 Spacer shims: Neoprene 50-60 Shore A durometer hardness to ASTM D 2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.4 Glazing tape:
.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper; black colour.
.2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal.

.5 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.

.6 Lock-strip gaskets: to ASTM C 542.

.7 Mirror adhesive: Synthetic rubber based adhesive, waterproof and mildew resistant: Franklin mirror adhesive. Low VOC compliant to SCAQMD Rule 1168-03.

.8 Mirror Clips: Type 316 custom fabricated stainless steel Vancouver type ‘H’ clips.

.9 Sealant: as specified in Section 07 92 00 – Joint Sealants. Low VOC.

PART 3 EXECUTION

3.1 Manufacturer’s Instructions

.1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 Examination

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

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 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.

3.4 Installation: Exterior Dry Method- Preformed Glazing

.1 Perform work in accordance with FGMA Glazing Manual IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Cut glazing tape to length; install on glazing light. Seal corners by butting tape and sealing junctions with sealant.

.3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

.5 Install removable stops without displacing glazing tape. Exert pressure for full continuous contact.

.6 Trim protruding tape edge.

3.5 Mirrors

.1 Coordinate work with Section 06 20 00.

.2 Install frameless mirrors in adhesive and with stainless steel H clips, concealed fasteners.

.3 Install mirrors in one piece unless shown otherwise.

3.6 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Perform cleaning to remove construction and accumulated environmental dirt.

.3 Remove traces of primer, caulking.
.4 Remove glazing materials from finish surfaces.

.5 Remove labels after work is complete.

.6 Clean glass using approved non-abrasive cleaner in accordance with manufacturer’s instructions.

.7 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.7 Protection of Finished Work

.1 After installation, mark light with an "X" by using removable plastic tape.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 92 00 Joint Sealants
.3 Section 07 84 00 Firestopping
.4 Section 09 22 16 Non-Structural Metal Framing
.5 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C1396 / C1396M - 14a Standard Specification for Gypsum Board
  .2 ASTM C475/C475M-12e1 Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  .3 ASTM C514-04(2014) Standard Specification for Nails for the Application of Gypsum Board
  .4 ASTM C840-13 Standard Specification for Application and Finishing of Gypsum Board
  .5 ASTM C954-11 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
  .6 ASTM C1047-14a Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
  .7 ASTM C1177/C1177M-13 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  .8 ASTM C1178/C1178M-13 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
.2 Canadian Standards Association (CSA)
  .1 CSA A82.31-M Gypsum Board Application.
  .2 CSA A82.27-M. Gypsum Board
.3 CAN/ULC-S102, Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics of.
.4 Underwriters Laboratories of Canada (ULC)
  .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit WHMIS Material Data Safety Sheets (MSDS) for all products, prior to delivery of products to the site.

1.5 Quality Assurance

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Use all means necessary to protect gypsum board materials before, during and after installation and to protect the installed work and materials of other trades affected by this work. Store materials in a dry area inside the building. Do not remove wrapping until ready for use. Prevent damage to all edges and surfaces.

1.7 Environmental Requirements

.1 Maintain temperature minimum 10^{O}C, maximum 21^{O}C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Gypsum Board

.1 To CSA A82.27-M and ASTM C1396/C1396M. Standard for non-rated applications, Type X for rated applications, 1220 mm wide x maximum practical length, ends square cut, edges tapered with round edge, 12.7 mm thick or to thickness indicated on drawings. All fire rated board shall be minimum 16 mm thickness.

.2 Water and Moisture Resistant Board: to CSA A82.27 and C1396/C1396M, 12.7 mm thick, 1220 mm wide with tapered edges.

.3 Abuse Resistant Gypsum Board: CGC Fibrerock abuse resistant fibre/gypsum panels, 16 mm thickness.

.4 Shaft Wall Liner: 25 mm thick shaftwall liner panels, to CSA A82.7, bevelled edge, 610 mm wide with ULC label.
.1 CGC Shaft Wall Liner Boards
.2 Certainteed Glasroc Shaftliner
.3 Georgia Pacific DENS Glass Shaftliner

2.2 Fastening and Adhesives

.1 Drywall Screws: To CSA A82.31-M, and ASTM C 1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

.2 Sheathing Screws: Pan head Buildex S-12 climaseal polymer coated, corrosion resistant self-tapping sheet metal screws minimum 32 mm long.

.3 Joint Tape: 50 mm perforated with preformed seam, mould and mildew resistant.
.1 Joint tape for abuse resistant gypsum board: CGC Mould Resistant Fiberglass Drywall Tape.

.4 Joint Compound: To CSA A82.31-M, asbestos-free.

.5 Joint Filler and Topping: Casein, vinyl or latex base, slow setting.

.6 Joint treatment for Gypsum Sheathing: 50 mm wide, 10 x 10 woven threads per inch, self-adhering fibreglass joint tape and Borden HPPG Elmer's Siliconized Acrylic Latex Caulk.

.7 Laminating Compound: To CSA A82.31-M, asbestos-free.

2.3 Acoustic Insulation

.1 Acoustic Insulation: Mineral or Glass Fibre Acoustic Insulation:
.1 Mineral Fibre Acoustic Insulation: To ASTM C 665, Mineral fibre blanket insulation, minimum density of 40 kg/m2:
.1 AFB Acoustical Fire Batts manufactured by Roxul Inc.
.2 Glass Fibre Acoustic Blanket Insulation: To CAN/ULC-S702, type 1, pre-formed unfaced glass fibre batt acoustic insulation.
.1 QUIETZONE Acoustic Blanket insulation manufactured by Owens Corning Canada.
.3 STC contribution and fire resistance (hr): Refer to NBC 1995, tables A-9.10.3.1-A/-B and Product Data Sheet for various assemblies contributing to acoustic performance and fire resistance.
.4 Surface burning characteristics to CAN/ULC-S102:
.1 flame spread: 15
.2 smoke developed: 5
.3 Smoulder resistance: to ULC S-129.
.4 Non-combustible: to CAN4-S114.
.5 Thickness to suit depth of wall framing and as indicated.

.2 Acoustic sealant: To ASTM E-814 and ASTM E-1966, with STC performance rating of 55 to ASTM E 90-99.

2.4 Accessories

.1 Casing Beads, Corner Beads and Edge Trim: To ASTM C 1047, 0.5 mm gauge base thickness commercial grade sheet steel with G90 zinc finish to ASTM A525-80A; perforated flanges; one piece length per location.

.2 Insulating Strip: Rubberized, moisture resistant, 3.0 mm thick, 12 mm wide closed cell neoprene strip, with self-sticking permanent adhesive on one face; lengths as required.

PART 3 EXECUTION

3.1 General

.1 Prior to installation of gypsum wallboard, ensure that all required vapour barriers, air seals, gaskets and the like installed under another Section have been inspected and accepted by Municipal

authorities and the Consultant. Failure to do so will result in removal of all gypsum board installed prior to approval and replacement, at no additional cost to the Owner.

3.2 Acoustic insulation

.1 Install acoustic blankets full width and length, with tight joints, between wall framing and around penetrating electrical service boxes, piping, air ducts and frames.

.2 Place acoustic blankets where indicated on the Drawings and to thickness required to obtain acoustic performance indicated for the assembly.

.3 Place acoustic blankets between studs ensuring friction fit, free of sags, folds or open joints that may let sound pass through.

.4 Install blankets from the bottom up, tightly adjusted and trim accurately with a utility knife.

.5 Install acoustic insulation is Squash Court walls.

3.3 Gypsum Board Application

.1 Do application and finishing of gypsum board in accordance with ASTM C 840 except where specified otherwise.

.2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.

.3 Do not apply gypsum board to ceilings until insulation, vapour retarder and air seals have been installed and inspected by others, including consultant, owner and municipal building inspectors.

.4 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.

.5 Install fibre gypsum abuse resistant panels where indicated. Treat joints with fibreglass reinforced joint tape in accordance with manufacturer’s instructions.

.6 Apply water resistant gypsum wallboard where indicated. Apply water resistant sealant to edges, ends and cut outs which expose gypsum core.

3.4 Gypsum Sheathing

.1 Install exterior gypsum sheathing horizontally on all exterior walls where indicated. Stagger joints between adjacent sheets.

.2 Screw-attach gypsum sheathing to each stud with 32 mm self-drilling corrosion resistant sheathing screws spaced 10 mm from ends and edges 200 mm o.c. Drive fasteners to bear tight against and flush with surface of sheathing. Do not countersink. Apply sealant around sheathing perimeter at interface with other materials and install flashing as indicated on the drawings.

.3 Apply fibreglass joint treatment to all joints, overlapping at intersections by the width of the tape. Apply 10 mm bead of sealant along the joint and embed the sealant into the entire surface of the tape with a trowel. Apply enough sealant to each exposed fastener to cover completely when trowelled smooth.

3.5 Cavity Shaft Wall

.1 Install runners, studs, liner panels and finish panels for fire rated assemblies where indicated, and in accordance with system manufacturer's printed instructions and to meet requirements for fire separation indicated.

3.6 Accessories

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.

.2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.3 Install insulating strips continuously at edges of gypsum board or casing beads abutting exterior door or window frames, to provide thermal break.

.4 Install continuous bead of acoustic sealant at all penetrations through sound control partitions.

3.7 Access Doors

.1 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.2 Rigidly secure frames to furring or framing systems, to satisfy fire rating requirements.

3.8 Taping and Filling

.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.2 Finish corner beads, control joints and trims as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.9 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM).
  .1 ASTM A653/A653M-15 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM C645-14e1 Standard Specification for Nonstructural Steel Framing Members
  .3 ASTM C754-15 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
.2 Canadian General Services Board (CGSB).
  .1 CAN/CGSB-1.40-97, Primer, Structural Steel, Oil Alkyd Type.
.3 Underwriters Laboratories of Canada (ULC)
  .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
.4 CSSBI Lightweight Steel Framing Manual

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit WHMIS Material Data Safety Sheets (MSDS) for all products, prior to delivery of products to the site.

1.5 Quality Assurance

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility.

PART 2 PRODUCTS

2.1 Metal Stud Framing Systems

.1 Non-load bearing channel stud framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
.1 Gauge of materials to conform to referenced standards unless noted otherwise.

.2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

.3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.

.4 Tie Wire: 0.90 mm, galvanized, soft annealed, steel wire or clip as recommended by the manufacturer of furring channels.

.5 Wind bearing light weight steel stud framing for exterior wall applications is specified in Section 05 41 00.

2.2 Metal Furring and Suspension Systems

.1 Metal Furring Runners, Hangers, Tie Wires, Inserts, Anchors: To CSA A82.30-M, electro-zinc coated steel.

.2 Runner Channels: 38 x 19 x 0.59 mm and 38 x 9.5 x 0.45 mm, hot dip or electro-galvanized sheet steel. Use of various sizes governed by applied loads and applicable spans.

.3 Drywall Furring Channel: Channel shaped furring member for screw attachment of drywall with knurled face. For interior use. Furring masonry or concrete surfaces. Cross furring under steel joist or suspended metal channels in suspended ceiling systems: 70 x 22 x 0.9 mm with knurled face, hot dip or electro-galvanized sheet steel. Bailey D-1001.

.4 Hangers: minimum 4.1 mm diameter (or as required by ULC fire rating design requirements) mild steel rods.

2.3 Shaft Wall Framing Systems

.1 Shaft Wall Framing (Firewalls): To meet requirements of ULC design as indicated including C-H studs, E studs, and J runners, hot dip galvanized.
.1 CGC Cavity Shaft Wall framing system.
.2 Certainteed Glasroc Shaftliner framing system.

2.4 Fasteners

.1 Powder activated fasteners: to suit structural conditions and fastening requirements and in accordance with manufacturer's recommendations: Ramset; Hilti; or approved equivalent.

.2 Sheet Metal Screws: To CSA A82.31-M, and ASTM C1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

2.5 Accessories

.1 Acoustic sealant: To ASTM E814 and ASTM E1966, with STC performance rating of 55 to ASTM E90-99.

.2 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self-sticking adhesive on one face, lengths as required.

.3 Zinc Rich Paint: to CGSB 1-GP-181M. Low VOC type meeting requirements of SCAQMD Rule 1113-96.

PART 3 EXECUTION

3.1 Erection

.1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.

.2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.3 Place studs vertically at 400 mm on centre unless noted otherwise and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Attach studs to bottom and ceiling track using screws.

.6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.9 Install heavy gauge single jamb studs at openings.

.10 Erect track at head of door/window openings and sills of window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

.13 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.14 Extend partitions to minimum 200 mm above ceiling height except where noted otherwise on drawings.

.15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.

.16 Install continuous insulating strips to isolate studs from un-insulated surfaces.

.17 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.2 Wall Furring

.1 Install wall furring for gypsum board wall finishes in accordance with CSA A82.31-M, except where specified otherwise and shown on drawings.

.2 Frame openings and around built-in equipment, cabinets, access panels, etc., on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.3 Shaft Wall Framing

.1 Install runners, studs, liner panels and finish panels where indicated, and in accordance with system manufacturer’s printed instructions and to meet requirements for fire separation as indicated.

3.4 Suspended and Furred Ceilings and Bulkheads

.1 Erect hanger and runner channels for suspended gypsum board ceilings in accordance with CSA A82.31-M except where specified otherwise and indicated on drawings.

.2 Securely anchor hanger to structural supports 1220 mm o.c. maximum along runner channels and not more than 150 mm from ends. Under no circumstances shall hanger wires be secured to or supported from mechanical or electrical materials or equipment or penetrate mechanical ductwork.

.3 Space runner or furring channels as shown on drawings and not more than 610 mm o.c. maximum nor 150 mm from walls. Run channels in long direction of board. Bend hanger sharply under bottom flange of runner and securely wire in place with a saddle tie. Provide channels below mechanical or electrical equipment and mechanical ductwork to maintain maximum spacing.

.4 Install furring channels transversely across runner channels in short direction of wallboard at 610 mm o.c. maximum or 150 mm from walls and interruptions in ceiling continuity. Secure channels to support with furring clips or wire. Where splicing is necessary lap minimum 200 mm and wire tie each end with double loops of 0.90 mm gauge galvanized tie wire, 25 mm from each end of overlap.

.5 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture. Coordinate with Electrical.

.6 Install work level to tolerance of 1:1200.

.7 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, etc.

.8 Install furring channels parallel to, and at exact locations of steel stud partition header track.

.9 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.

3.5 Gypsum Board

.1 Installation of gypsum board is specified in Section 09 21 16

3.6 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 22 00 Concrete Unit Masonry
.2 Section 05 50 00 Metal Fabrications
.3 Section 06 20 00 Finish Carpentry
.4 Section 06 40 00 Architectural Woodwork
.5 Section 08 11 00 Metal Doors and Frames
.6 Section 08 14 16 Stile and Rail Wood Doors
.7 Section 09 21 16 Gypsum Board

1.3 References

.1 Department of Justice Canada (Jus)
  .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
.2 Environmental Protection Agency (EPA)
  .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).
.4 Master Painters Institute (MPI)
  .1 MPI Architectural Painting Specifications Manual, 2004.
.5 National Fire Code of Canada - 1995
.6 Society for Protective Coatings (SSPC)
  .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
.7 South Coast Air Quality Management District, California State (SCAQMD)
  .1 SCAQMD Rule 1113-96, Architectural Coatings.
.8 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997.
.9 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:
  .1 Submit product data and instructions for each paint and coating product to be used.
  .2 Submit product data for the use and application of paint thinner.
  .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS). Indicate VOCs during application and curing.

.3 Samples:
  .1 Submit full range colour sample chips to indicate where colour availability is restricted.
  .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
  .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with

specified performance characteristics and physical properties and SCAQMD Rule 1113-96.

.5 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
.1 Product name, number, type and use.
.2 Colour numbers.
.3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

.1 Qualifications:
.1 Contractor: minimum of five years proven satisfactory experience.
.2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
.3 Apprentices: working under direct supervision of qualified tradesperson in accordance with trade regulations.

.2 Mock-Ups:
.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
.2 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen and textures.
.3 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
.4 Locate where directed.
.5 Allow 24 hours for inspection of mock-up before proceeding with work.
.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Acceptance at Site:
.1 Identify products and materials with labels indicating:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.4 Remove damaged, opened and rejected materials from site.

.5 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 7^0 C to 30^0 C.

.6 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
.7 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.

.8 Remove paint materials from storage only in quantities required for same day use.

1.7 Fire Safety Requirements

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).

.4 Separate for reuse and recycling and place in designated containers waste in accordance with Waste Management Plan (WMP).

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with Municipal regulations.

.7 Ensure emptied containers are sealed and stored safely.

.8 Unused materials must be disposed of at official hazardous material collections site as approved by Owner.

.9 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.10 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.11 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.12 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
.4 Dispose of contaminants in approved legal manner in accordance with hazardous waste

regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.13 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.9 Maintenance

.1 Extra Materials:
- .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
- .2 Quantity: provide one four litre can of each type and colour of primer stain finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Delivery, storage and protection: comply with Consultant's requirements for delivery and storage of extra materials.

1.10 Ambient Conditions

.1 Heating, Ventilation and Lighting:
- .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
- .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10^0 C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .3 Provide continuous ventilation for seven days after completion of application of paint.
- .4 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.
- .5 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless pre-approved written approval by Specifying body Paint Inspection Agency Authority and product manufacturer, perform no painting when:
  - .1 Ambient air and substrate temperatures are below 10^0 C.
  - .2 Substrate temperature is above 32^0 C unless paint is specifically formulated for application at high temperatures.
  - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
  - .4 The relative humidity is under 85% or when the dew point is more than 3^0 C variance between the air/surface temperatures. Paint should not be applied if the dew point is less than 3^0 C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
  - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
  - .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .2 Perform painting work when maximum moisture content of the substrate is below:
  - .1 Allow new concrete to cure minimum of 28 days.
  - .2 15% for wood.
  - .3 12% for plaster and gypsum board.

.3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".

.4 Test concrete and plaster surfaces for alkalinity as required.

.5 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.

.6 Additional interior application requirements:
.1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

PART 2 PRODUCTS

2.1 Materials

.1 Products to meet requirements of GS-03, GS-11 or SCAQMD Rule 1113-96

.2 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.3 Provide paint materials for paint systems from single manufacturer.

.4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.

.5 Conform to latest MPI requirements for interior painting work including preparation and priming.

.6 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.

.7 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.8 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
.1 Water-based, Water clean-up.
.2 Non-flammable, biodegradable.
.3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
.4 Manufactured without compounds which contribute to smog in the lower atmosphere.
.5 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.
.6 Recycled content of 15% post-consumer and ½ post-industrial waste.

.9 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.10 Flash point: 61^{0}C or greater for water-borne surface coatings and recycled water-borne surface coatings.

.11 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:

.1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.
.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.

.12 Recycled water-borne surface coatings to contain 50% post-consumer material by volume.

.13 Recycled water-borne surface coatings must not contain:
.1 Lead in excess of 600.0 ppm weight/weight total solids.
.2 Mercury in excess of 50.0 ppm weight/weight total product.
.3 Cadmium in excess of 1.0 ppm weight/weight total product.
.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.
.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

2.2 Colours

.1 Consultant will provide Colour Schedule.

.2 Colour schedule will be based upon selection of eight base colours and six deep tint accent colours.

.3 Selection of colours will be from manufacturer’s full range of colours. All paint colours to be chosen from Schools approved paint options and to be mildew resistant in bathrooms, Benjamin Moore Scuffex.

.4 Where specific products are available in restricted range of colours, selection based on limited range.

.5 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.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

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

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces as specified and as noted on Finish Schedule.

2.5 Interior Painting Systems

.1 Concrete Masonry Units:
.1 INT 4.2D high performance architectural latex G5 semi-gloss finish.

.2 Metal Fabrications:
.1 INT 5.3A Latex G5 semi-gloss finish

.3 Galvanized Metal: interior doors, frames, pipes, and ducts.
.1 INT 5.3A Latex G5 semi-gloss finish

.4 Wood Paint Finish:
.1 INT 6.3A high performance architectural latex G5 semi-gloss finish.

.5 Wood Clear Polyurethane Finish:
.1 INT 6.3K Polyurethane varnish G6 gloss finish.

.6 Gypsum Board: Walls
.1 INT 9.2A Latex G3 eggshell finish over latex sealer.

.7 Gypsum Board: Ceilings and bulkheads:
.1 INT 9.2A Latex G2 velvet finish over latex sealer.

.8 All other surfaces not noted above: high performance finish suitable for wet and institutional environment and in accordance with MPI painting manual.

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.

3.3 Examination

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces

to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:
.1 Plaster and gypsum board: 12%.
.2 Concrete: 12%.
.3 Wood: 15%.

3.4 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 Consultant.
.2 Protect items that are permanently attached such as Fire Labels on doors and frames.
.3 Protect factory finished products and equipment.

.2 Surface Preparation:
.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-install after painting is completed.
.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
.3 Place "WET PAINT" signs in occupied areas as painting operations progress.

.3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths, or compressed air.
.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
.4 Allow surfaces to drain completely and allow to dry thoroughly.
.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
.6 Use trigger operated spray nozzles for water hoses.
.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
.2 Apply wood filler to nail holes and cracks.
.3 Tint filler to match stains for stained woodwork.

.6 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.

.7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.

.8 Touch up of shop primers with primer as specified.

.9 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.5 Application

.1 Brush and Roller Application:
- .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
- .2 Work paint into cracks, crevices and corners.
- .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
- .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
- .5 Remove runs, sags and brush marks from finished work and repaint.

.2 Spray application:
- .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
- .4 Brush out immediately all runs and sags.
- .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

.3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

.4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 Finish surfaces both above and below sight lines as specified for surrounding surfaces.

.8 Finish alcoves as specified for adjoining rooms.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 Mechanical/Electrical Equipment

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and

electrical equipment with colour and finish to match adjacent surfaces.

.2 Mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.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.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.10 Paint natural gas piping yellow.

.11 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.12 Do not paint interior transformers and substation equipment.

3.7 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.

3.8 Field Quality Control

.1 Interior painting and decorating work shall be inspected by the Consultant.

.2 Standard of Acceptance:
.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 to approval of Consultant. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

3.10 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section