

CONTRACT DOCUMENTS

FOR THE

SHEDDEN ATHLETIC PARK
WASHROOMS AND PAVILION

CORPORATION OF THE
MUNICIPALITY OF SOUTHWOLD



TOWNSHIP OF
Southwold



SPRIET ASSOCIATES
engineers & architects

ARCHITECT: SPRIET ASSOCIATES LIMITED
ARCHITECTS
155 York Street
London, Ontario
N6A 1A8
Tel: (519) 672-4100
Fax: (519) 433-9351

STRUCTURAL
ENGINEER: SPRIET ASSOCIATES LONDON LIMITED
CONSULTING ENGINEERS
155 York Street
London, Ontario
N6A 1A8
Tel: (519) 672-4100
Fax: (519) 433-9351

MECHANICAL &
ELECTRICAL
ENGINEERS CALLIDUS ENGINEERING
9-1385 N. Routledge Park
London, Ontario
N6H 5N5
Tel: (519) 472-7640
Fax: (519) 471-9239

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Form of Tender

To: The Mayor and Council of
 The Corporation of the Municipality of Southwold
 35663 Fingal Line
 Fingal, Ontario
 N0L 1K0

Having examined the Contract Documents for the "**Shedden Athletic Park Washrooms and Pavilion**", dated June 7, 2019, prepared by Spriet Associates Limited Architects and Consulting Engineers, and having received the following addenda issued by the Consultant during the tender period,

and having examined the site and all conditions affecting the Work, we, the undersigned General Contractor propose to furnish all labour, equipment and materials and complete the Contract as called for by the said Documents in the time specified for the following amount:

(a)	Building Work (exclusive of trades below)	\$ _____
(b)	Plumbing Work	\$ _____
(c)	Mechanical Work	\$ _____
(d)	Electrical Work	\$ _____
(e)	Finish Hardware Allowance	\$ <u>8,000.00</u>
(f)	Contingency & Testing Allowance	\$ <u>8,000.00</u>
	Sub-total of above	\$ _____
	13% Harmonized Sales Tax	\$ _____
	TOTAL CONTRACT AMOUNT	\$ _____

/100 Dollars

(Contract Price to be Written in Full)

The above Total Contract Price includes all Harmonized Sales Taxes. It is specifically understood that the Contingency and Testing Allowance is to be expended only as directed by the consultant, and that any unused portion of this allowance shall revert to the Owner.

We agree to guarantee all of the Work for a minimum period of one (1) year from the date of acceptance (substantial completion) of same by the Consultant.

Form of Tender (cont'd)

If awarded the Contract, we agree to complete the Work substantially by March 18, 2020 and be finally completed by April 1, 2020.

The following is a list of the sub-trades we propose to use:

<u>TRADE</u>	<u>NAME OF SUBCONTRACTOR OR SUPPLIER</u>
Site Work	_____
Concrete Supplier	_____
Floor Finishes	_____
Masonry	_____
Roofing and Flashing	_____
Painting	_____
Plumbing	_____
Mechanical	_____
Electrical	_____

Our Tender includes the following Allowances:

(a) Finish Hardware Allowance	\$ 8,000.00
(b) Contingency & Testing Allowance	\$ 8,000.00

Form of Tender (cont'd)

We, the undersigned General Contractor, by this Tender, offer to complete the Contract in accordance with the terms contained herein.

Dated _____ this ____ day of _____, 2019

Witness _____

Signature of Authorized
Person signing for General
Contractor

Corporate Name of General Contractor

Address of General Contractor

Telephone Number

Corporate Seal

PART 1 - GENERAL

1.1 Description of the Work

- .1 The work covered by this Contract includes the construction of a new washrooms c/w holding tank, pavillion and limited Site Works.

1.2 Place of Work

- .1 The place of work is located at:

SOUTHWOLD CON SNBTR PT LOT 16 RP 11R10140 PARTS 1 TO 24 PART 1
Adjacent to 9184 Union Rd. Shedden, Ontario

1.3 Owner

- .1 The Owner is:

Corporation of the Municipality of Southwold
35663 Fingal Line
Fingal, Ontario
N0L 1K0

1.4 Scope

- .1 The scope of this project shall be all work indicated in the Tender Documents, which consists of the following:
 - .1 Form of Tender and Instructions to Bidders
 - .2 All Addenda issued.
 - .3 Drawings and Specifications noted in the List of Contract Drawings.

1.5 Submitting Tenders, Opening Tenders and Bid Acceptance Period

- .1 The Form of Tender shall be submitted, sealed in an opaque envelope with contents clearly labelled, and shall be delivered to the:

Spriet Associates London Limited
155 York Street
London, Ontario
N6A 1A8
 - .2 Tenders shall be submitted on the Forms herewith provided and shall be signed where indicated on the last page of the Form of Tender.
 - .3 Tenders will be received up to 2:00 p.m., local time, Friday, June 21, 2019.
 - .4 Offers submitted after the above time shall be returned to the bidder unopened.
 - .5 Tenders which are incomplete, conditional, illegible, or obscure or qualified in any way, or that contain additions not called for, erasures, alterations, or irregularities of any kind, will be rejected as informal. The Bidder shall give the Total Contract Price in both words and figures and shall fill in all blank spaces.
 - .6 All tenders shall remain valid for forty-five (45) days after closing date of tender period. If after forty-five (45) days, no contract has been signed between the Owner and Contractor, the Tender will no longer be valid.
-

1.6 Security Deposit

- .1 The bidder shall include with the Form of Tender a Bid Bond in the amount of 10% of the Contract Price.
- .2 Endorse the Bid Bond in the name of the Owner.
- .3 The Bid Bond will be returned after delivery to the Owner of the required Performance and Labour and Materials Payment Bond(s) by the accepted bidder.
- .4 The Bid Bond will become payable in the event of the failure of the Tenderer to sign the Contract within a period of forty-five (45) days.
- .5 If no contract is awarded, all security deposits will be returned.

1.7 Agreement to Bond

- .1 Submit with the Form of Tender and Bid Bond an "Agreement to Bond", stating that the Surety providing the Bid Bond is willing to supply the Performance and Labour and Materials Payment Bonds required under this Contract. Include the costs associated with this requirement in the Contract Price.

1.8 Acceptance or Rejection of Tenders

- .1 The Owner reserves the right to reject any or all Tenders and the lowest or any Tenders will not necessarily be accepted.
- .2 The Owner shall not be responsible for any liabilities, costs, expenses, loss or damage incurred, sustained or suffered by any Bidder by reason of the acceptance or non-acceptance by the Owner of any tender save as provided in the Contract. Tenders are subject to a formal contract being prepared and executed.
- .3 The Construction Contract shall be awarded as a complete project to the General Contractor.

1.9 Contract Award Procedures

- .1 Unless stated otherwise the following procedures will apply:
 - .1 The Owner will notify the successful Tenderer that his Tender has been accepted within 45 days of the Tender opening.
 - .2 Notice of acceptance of the Tender will be by telephone and/or by written notice.
 - .3 The required Contract Documents will be sent to the successful Tenderer immediately after acceptance of the Tender. The Tenderer shall fully execute and return the documents together with the applicable bonds, Certificates of Insurance and any other required documents to the Owner within 10 days of receipt.
 - .4 Following receipt by the Owner of the properly executed documents, Certificates of Insurance and Contract Bonds, the Contractor will receive written authority to proceed with the Work.
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1.10 Approved Alternate

- .1 For approval of products, other than those specified, applicants shall submit a request in writing to the Consultant. Requests shall clearly define and describe the product for which approval is requested. Requests shall be accompanied by manufacturer's literature, specifications, etc., to completely describe the item. Consideration will not be given to materials as being an equal or alternate to those specified after three (3) working days prior to the closing of tenders.
- .2 When a product has been reviewed by the Consultant as to being an approved alternate or equal, the Consultant will issue an "Approved Alternate" memo. This memo will be sent to the individual applicant which requested the approval. The applicant must provide proof of such approval to all General Contractors to whom he may be submitting a quotation. No product will be accepted for use in the work unless it has been approved by the Consultant.
- .3 The cost of all revisions or adjustments related to the acceptance of alternates must be included in the Contract Price.

1.11 Addenda

- .1 All addenda issued during the tender period shall be read with and form part of the Contract Documents. Receipt of each addendum must be acknowledged on the Form of Tender.
- .2 No addendum(s) will be issued within 48 hours prior to bid closing. All addendum(s) become part of the tender documents and must be acknowledged, signed and submitted as instructed with the bid.

1.12 Completion Date

- .1 The Completion Date for the work as determined by the Owner shall be as indicated on the Form of Tender. The Contractor shall attain Substantial Performance of the work on or before this date.
- .2 The bidder, in submitting an offer, accepts and agrees to the Completion Date indicated on the Form of Tender.
- .3 The Completion Date specified herein is based on approval to proceed within 15 calendar days of the date of submission of tender, and will be extended by the same number of days that the 15 calendar days are exceeded if some delay should occur.

1.13 General Conditions

- .1 The General Contractor should be aware that the General Conditions of CCDC2-2008 have been incorporated into these specifications.

1.14 Inquiries

- .1 All Inquiries regarding this Tender are to be directed to the applicable Consultant, listed on the front page of this specification. No verbal communication shall modify the terms, conditions or specifications, until they are confirmed in writing.
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- .2 Should a Bidder find omissions from or discrepancies in any of the Tender Documents or should he be in doubt as to the meaning of any part of such Documents, he should notify the Consultant, preferably in writing and not later than 48 hours before the closing date for tenders. If the Consultant considers that a correction, explanation or interpretation is necessary or desirable, he will issue an addendum to all Bidders.

1.15 Basis of Tendering

- .1 The site shall be accepted by the Contractor in its present condition. The Contractor shall visit the site and carefully note all conditions affecting the site and the work to be done thereon. The Contractor shall accept sole responsibility for any errors or neglect on his part in this respect.
- .2 If any person submitting a bid on this project is in doubt as to the true meaning and intent of any part of the Specifications or other documents, he must request an interpretation from the Consultant. If such interpretation is not requested, the bids will be presumed to be based on the interpretations or directions that may be subsequently given by the Consultant after the award of the Contract, in accordance with the provisions of the Contract.
- .3 Prior to the closing date of the tenders, any and all necessary clarifications of the Specifications or other tender documents will be in the form of written Addenda. The Consultant will not be responsible for verbal instructions on any explanations or interpretation of Drawings and Specifications.
- .4 The tenders shall be based on the use of the definitively mentioned article(s) or manufacturer(s).

1.16 Examination of the Site

- .1 No claims for extra payment to the Contractor will be allowed for extra work made necessary or difficulties encountered due to conditions of the site which were visible upon or reasonably inferable from an examination of the said site prior to the closing of tenders. Failure of the Contractor to visit and examine the site shall be deemed a waiver of all claims for extra payment due to any conditions of the site existing prior to the closing of tenders.

1.17 Bonds

- .1 Refer to Section 00800 Amendments to and Supplementary General Conditions for Bond requirements.

1.18 Contractor's Insurance Requirements

- .1 Refer to GC 11-1 "Insurance" for Contractors insurance obligations.

1.19 Permits and Fees

- .1 Refer to Section 00800 Amendments to and Supplementary General Conditions for Permit and Fee requirements.
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1.20 Subcontractors

- .1 The Bidder shall list in Form of Tender, the name of each proposed subcontractor used in making up his Tender or by entering "Own Forces", which ever applies. Only one subcontractor shall be named for each part of the Work to be sublet. No blank spaces are to be left for the subtrades listed.
- .2 The Bidder or the Contractor shall not be allowed to substitute other subcontractors in place of those named in the Tender without written approval of the Consultant.

1.21 Sales Taxes

- .1 Refer to Section 00800 Amendments to and Supplementary General Condition._

1.22 Laws and Regulations

- .1 The Bidder is assumed to have made himself familiar with and abide by the Federal, Provincial, Municipal and local laws, rules and regulations which in any manner affect those engaged or employed in the Work, or in any way affect the Work, and no plea of misunderstanding will be considered on account of ignorance thereof. If the Bidder shall discover any provisions in the Drawings, Specifications or Contract which are contrary to or inconsistent with any law, rule or regulation, he shall at once report it to the Consultant in writing.

1.23 Cash Allowances

- .1 Refer to Section 00800 Amendments to and Supplementary General Conditions. _

1.24 Workplace Safety and Insurance Board Clearance

- .1 The Contractor shall, at the time of entering into any contract with the Owner, make a statutory declaration by providing a satisfactory clearance letter from the Workplace Safety and Insurance Board stating that all assessments or compensation payable to Workplace Safety and Insurance Board have been paid.
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PART 1 - GENERAL

1.1 CONSTRUCTION CONTRACT

- .1 The General Conditions contained in the Standard Construction Document CCDC 2-2008, Stipulated Price Contract published by the Canadian Construction Documents Committee and approved by the Royal Architectural Institute of Canada and the Engineering Institute of Canada which are hereby included as a part of this Contract. These General Conditions are bound herein and are a part of all sections of these specifications. An index of the above General Conditions are as follows:

Definitions

Part 1 General Provisions

- GC 1.1 Contract Documents
- GC 1.2 Law of the Contract
- GC 1.3 Rights and Remedies
- GC 1.4 Assignment

Part 2 Administration of the Contract

- GC 2.1 Authority of the Consultant
- GC 2.2 Role of the Consultant
- GC 2.3 Review and Inspection of the Work
- GC 2.4 Defective Work

Part 3 Execution of the Work

- GC 3.1 Control of the Work
- GC 3.2 Construction by Owner or Other Contractors
- GC 3.3 Temporary Work
- GC 3.4 Document Review
- GC 3.5 Construction Schedule
- GC 3.6 Supervision
- GC 3.7 Subcontractors and Suppliers
- GC 3.8 Labour and Products
- GC 3.9 Documents at the Site
- GC 3.10 Shop Drawings
- GC 3.11 Use of the Work
- GC 3.12 Cutting and remedial Work
- GC 3.13 Cleanup

Part 4 Allowances

- GC 4.1 Cash Allowances
- GC 4.2 Contingency Allowance

Part 5 Payment

- GC 5.1 Financing Information Required of the Owner
 - GC 5.2 Applications for Progress Payment
 - GC 5.3 Progress Payment
 - GC 5.4 Substantial Performance of the Work
 - GC 5.5 Payment of Holdback upon Substantial Performance of the Work
 - GC 5.6 Progressive Release of Holdback
 - GC 5.7 Final Payment
 - GC 5.8 Withholding of Payment
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- GC 5.9 Non-conforming Work
- Part 6 Change in the Work
- GC 6.1 Owner's Right to Make Changes
- GC 6.2 Change Order
- GC 6.3 Change Directive
- GC 6.4 Concealed or Unknown Conditions
- GC 6.5 Delays
- GC 6.6 Claims for a Change in Contract Price
- Part 7 Default Notice
- GC 7.1 Owner's Right to Perform the Work, Terminate the Contractor's Right to Continue with the Work or Terminate the Contract
- GC 7.2 Contractor's Right to Suspend the Work or Terminate the Contract
- Part 8 Dispute Resolution
- GC 8.1 Authority of the Consultant
- GC 8.2 Negotiation, Mediation, and Arbitration
- GC 8.3 Retention of Rights
- Part 9 Protection of Persons and Property
- GC 9.1 Protection of Work and Property
- GC 9.2 Toxic and Hazardous Substances
- GC 9.3 Artifacts and Fossils
- GC 9.4 Construction Safety
- GC 9.5 Mould
- Part 10 Governing Regulations
- GC 10.1 Taxes and Duties
- GC 10.2 Laws, Notices, Permits, and Fees
- GC 10.3 Patent Fees
- GC 10.4 Workers' Compensation
- Part 11 Insurance - Bonds
- GC 11.1 Insurance
- GC 11.2 Contract Security
- Part 12 Indemnification - Waiver - Warranty
- GC 12.1 Indemnification
- GC 12.2 Waiver of Claims
- GC 12.3 Warranty

PART 1 - GENERAL

1.1 General

- .1 All articles contained within these Supplementary General Conditions shall be read in conjunction with, and apply to, the General Conditions of the Construction Contract.

PART 2 - SUPPLEMENTARY GENERAL CONDITIONS

2.1 GC-1.1 Contract Documents

- .1 Amend Item 1.1.7 to include in order, (1) the Form of Tender and (2) all Addenda. The priority of these documents shall follow, "the Agreement between the Owner and the Contractor", and precede "the Definitions".

2.2 GC-3.10 Shop Drawings

- .1 Add the following new Item 3.10.13: Refer to Section 01000, General Requirements for additional submission requirements.

2.3 GC-4.1 Cash Allowances

- .1 Add the following new Item 4.1.8: The Testing Allowance, when included in the Contract is to cover the cost of inspection and testing work done by the independent inspection and testing company appointed by the Consultant, and does not cover labour costs, overhead, or profit of the Contractor for work such as sampling, transportation of samples, etc., done by the Contractor. Cash allowances for inspection and testing do not cover the cost of re-testing of materials required due to the failure to meet the requirements of the applicable specification.
- .2 Add new Item 4.1.9: The Hardware Allowance, when included in the Contract, is to cover the cost of materials and installation.

2.4 GC-5.2 Applications for Progress Payments

- .1 Add the following new Item 5.2.8: No payment will be made on account of this Contract until all required certificates, clearances, etc., are in the possession of the Owner.

2.5 GC-6.2 Change Order

- .1 Add the following new Item 6.2.3: When a change in the work is proposed or required as indicated in Item 6.2.1 the Contractor shall submit in addition to his itemized costs of labour and materials, not more than fifteen percent (15%) for the Contractors overhead and profit on the total of the above. The Contractor shall include not more than ten percent (10%) of any subcontractor's total to cover the Contractor's overhead and profit. The allowance for Contractor's overhead shall include all site and office overhead, ie. supervisory labour, insurance, hydro, water, office staff, etc.
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2.6 GC-10.1 Taxes and Duties

- .1 Delete paragraph 10.1.1 and replace with: The Contract Price shall include all taxes and customs duties in effect at the time of the bid closing, including the Value Added Taxes payable by the Owner to the Contractor as stipulated in Article A-4 of The Agreement - CONTRACT PRICE.

2.7 GC-10.2 Laws, Notices, Permit, and Fees

- .1 Revise the following 10.2.2: The Contractor shall obtain development approvals, building permit, permanent easements, right of servitude, and all other necessary approvals and permits, including the permits and fees referred to in paragraph 10.2.3. The Owner is responsible for paying for the development approvals and all required approvals included in 10.2.2.

2.8 GC-11.2 Contract Security

- .1 Add the following new Item 11.2.3: If a Bid Bond is included with the Form of Tender the successful bidder will be required to furnish a fifty percent (50%) Performance Bond and a fifty percent (50%) Labour and Materials Payment Bond. The cost of each to be paid for by the Contractor.

2.9 GC-12.3 Warranty

- .1 Add the following new Item 12.3.7: "The Contractor shall submit written warranty or guarantee certificates and extended warranty or guarantees for all work as required in the specifications. All warranties and guarantee certificates shall be included in the Maintenance manual required elsewhere in these Specifications. The guarantee shall be addressed to the Owner and state the following:
 - .1 Date of Substantial or Total Performance as applicable to the warranty or guarantee period;
 - .2 Name of Project to be same as indicated in the Contract;
 - .3 Address of Project;
 - .4 Terms and Conditions;
 - .5 Warranty or Guarantee Period".

PART 1 - GENERAL

1.1 General

- .1 Unless specified otherwise, the provisions of this Section shall apply to all Sections and Divisions of the Specifications.
- .2 Read "Part 1 - General" of all Sections to these specifications to determine the full extent of work required by your Section(s).
- .3 Study all Contract Documents to determine additional work required by your Section on which the work of other Sections depends.

1.2 Specification Format

- .1 These Specifications are not intended as a detailed description of installation methods but serve to indicate particular requirements in the completed work.
- .2 Conform to the Current Ontario Building Code together with all its related supplements, hereinafter referred to as the "Code". Where Drawings and/or Specifications exceed Code requirements, provide such additional requirements.
- .3 The Specifications are divided into Divisions and Sections for the convenience of the Contractor and the Consultant, and shall be interpreted as a whole.
- .4 Where the aforementioned Code or this Specification does not provide all information necessary for complete installation of an item, then the manufacturer's instruction for first quality workmanship shall be strictly complied with.
- .5 Where words in the Contract Documents occur in the singular number, they shall be taken as plural where applicable in accordance with the quantities required to satisfy the requirements of the Contract.

1.3 Co-ordination

- .1 Allocate mobilization areas of site; for field offices and sheds, for stockpiling, access, traffic, and parking facilities.
- .2 During construction co-ordinate use of site and facilities through procedures for submittals, reports and records, schedules, co-ordination of drawings, recommendations, and resolution of ambiguities and conflicts.
- .3 Provide information required for preparation of co-ordination drawings. Review and approved revised drawings for submission to Consultant.
- .4 The responsibility as to which sub-trade provides required articles, labour, or materials to be built in or provided, rests solely with the Contractor. Extras will not be considered, based on grounds of difference in interpretation of Specifications and Drawings.

1.4 Examination

- .1 Examine the work upon which your work depends. Report to the Consultant in writing any defects in such work. The application of your work or any part of it shall be deemed acceptance of the work upon which your work or that part of it which has been applied depends.
 - .2 Drawings are, in part, diagrammatic and are intended to convey scope of work and indicate general and approximate location, arrangement and sizes of fixtures and
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indicate general and approximate location, arrangement and sizes of fixtures and equipment. Obtain more accurate information about locations, arrangements and sizes from study and co-operation of shop drawings, including Architectural, Structural, Mechanical, and Electrical Drawings and become familiar with conditions and spaces affecting these matters before proceeding with the work. Where job conditions require reasonable changes in indicated locations and arrangements, make changes at no additional cost to the Contract. Install and arrange fixtures and equipment in such a way as to conserve as much headroom and space as possible.

1.5 Lines, Levels and Dimensions

- .1 The Contractor shall, immediately upon entering the project site for purpose of beginning work, locate all general reference points and take such action as is necessary to prevent their destruction; lay out his own work and be responsible for all lines, elevations and measurements of buildings, grading, paving, utilities and other work executed by him under the Contract. Establish lines and levels, locate and layout, by instrumentation. The Contractor must exercise proper precaution to verify figures shown on the Drawings before laying out work and will be held responsible for any error resulting from his failure to exercise such precaution.
- .2 On completion of foundation work, provide and pay for a certified survey (performed by a Registered Land Surveyor) showing dimensions, locations, angles and elevations of work.

1.6 Standards and Definitions

- .1 Where a reference is made in the specifications to Standards produced by various organizations, conform to the latest edition of the standard, as amended and revised at date of Contract.

1.7 Documents

- .1 The Contractor shall be responsible to see that all of his sub-contractors are fully informed in regard to the General Conditions, regulations, revisions, and addenda which may be issued.
- .2 No deviation from the Drawings and Specification shall be made in the execution of the work, without the written approval of the Consultant.

1.8 Shop Drawings

- .1 Refer to GC 3.10 of the Standard Construction Document, C.C.D.C. No. 2, 2008 for additional requirements.
 - .2 Submit to Consultant submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as to not cause delay in the work.
 - .3 Work affected by submittal shall not proceed until review is complete.
 - .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connection, explanatory notes and other information necessary for completion of work. Indicate all work by others.
 - .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 co-ordinated with requirements of the work and Contract Documents.
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- .6 Verify field measurements and affected adjacent work are co-ordinated. The Consultant is not responsible for on site measurements.
- .7 Electronic submissions of shop drawings are to be emailed to the Consultant Project Manager. Only provide hard copies if requested.
- .8 Electronic submissions of product data sheets or brochures for requirements requested in specification Sections, and as the Consultant may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.
- .9 Samples are to be provided in accordance with the specification section. The Consultant has the right to request samples even if not specified within specific sections to further clarify if required.

1.9 Project Meetings

- .1 After the award of the Contract, and in consultation with the Consultant, the Contractor shall arrange job meetings at regular intervals, between all parties concerned, in order to ensure proper co-ordination of the Work.
- .2 The Contractor shall notify all parties concerned of the time and place of the meetings.
- .3 The Contractor shall record the minutes of such meetings, and shall promptly distribute the necessary copies of such minutes, within 3 days after such meetings, to all parties concerned.

1.10 Construction Schedule

- .1 Refer to GC 3.5 of the Standard Construction Document, CCDC 2, 2008 for requirements.

1.11 Materials and Installation

- .1 Products, materials, equipment and articles (referred to as Products throughout specifications) incorporated in work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
 - .2 Defective products will be rejected regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
 - .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
 - .4 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and reinstallation at no increase in Contract Price.
 - .5 Where a material is specified and work is to be done in accordance with the manufacturer's specifications, said specifications shall be as issued by the manufacturer(s) at the date of signing the Contract. The Contractor is to be responsible for making himself acquainted with these specifications, and they shall become a part of the Specifications for this work, with the same force as though printed in full in the Contract Specifications.
 - .6 All materials must be shipped prepaid and consigned to the Contractor or
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- .6 All materials must be shipped prepaid and consigned to the Contractor or sub-contractor. All materials shall be delivered to the building site at the Contractor's expense. The Contractor must be responsible for the transporting of all materials to and from the work.

1.12 Concealment of Pipes, Ducts, Tubing and Wiring

- .1 Pipes, ducts, tubing and wiring shall be concealed in the floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.13 Temporary Facilities and Utilities

- .1 The Contractor shall provide, install, maintain and locate, where directed and approved by the Owner, temporary facilities as described in this Section, for the work and for all trades except where specified otherwise, and remove them upon completion of the work. All temporary facilities shall be paid for by the Contractor.
 - .2 Water Supply: provide a continuous supply of potable water for construction use. Arrange for connection with appropriate utility company and pay costs for installation, utility charges, maintenance and removal.
 - .3 Temporary Power: provide and pay for temporary power required during construction used for temporary lighting and power tools. Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
 - .4 Contractor's Office: provide and maintain as long as required, an approved temporary building for the Contractor's Office. This Office shall be provided with heat, power, light, and a table for the examination of drawings. Contractor to have a cellular phone on site to allow for communications with Consultant.
 - .5 Temporary Toilets: provide where directed, for use of all persons on the job, adequate portable toilet facilities with weatherproof enclosures, all to the approval of the Department of Health, Municipal Regulations, and the Consultant. These facilities shall be removed and the site left in a neat, clean and sanitary condition upon completion of the work.
 - .6 Heat, heating equipment, and shelter: Contractor shall provide and maintain, unless otherwise specified, heat and shelter to keep that work which requires protection from cold adequately warm and sheltered from elements, and allow it to be done safely and well.
 - .7 Temporary heat: provide, operate and maintain temporary heating equipment as required until work is complete, unless specified to be provided by the particular section requiring temporary heat. Temporary heaters shall be forced warm air type, operated in well ventilated locations and vented to exterior, or radiant panel type. If used in areas of the completed building, provide protection on floors and adjacent surfaces to prevent damage, particularly when refueling. The Contractor is responsible for all fuel cost for temporary heat.
 - .8 Permanent heating system: systems of the building may be used during construction, provided all warranties are still provided as of the date of Substantial Completion, proper servicing is maintained, extra precautions are taken to protect the system, the entire system is brought up to an "as new" condition at the time of completion, and all costs are borne by the Contractor. The maintenance program and agreement must be submitted to the Consultant and approval received before using the permanent heating system.
 - .9 Hoist equipment: Provide a fully qualified hoist operator to operate hoist
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- .9 Hoist equipment: Provide a fully qualified hoist operator to operate hoist equipment. All trades to make their own financial arrangements with Contractor for use thereof.
- .10 Roads, walks, ramps, stairs (and other means of access as required): maintain temporary entrances to Building, including enclosed hoardings if deemed necessary by the Consultant. Bridge temporary excavation with materials and construction to safely support any load that could be imposed. Co-ordinate access to existing building with Owner.
- .11 Dewatering trenches and building from damage by rainwater, ground water, backing up of drains or sewers, and other water, frost and other weather conditions. Provide sheeting, piling, shoring, pumps, equipment, temporary drainage and enclosures required for this protection. Provide necessary pumps including spare pump for keeping project free of water throughout construction period. Pump water to existing sewers by adequate means.

1.14 Scaffolding

- .1 Erect scaffolding independent of walls. Use it in such a manner as to interfere as little as possible with other trades. When not in use, it shall be movable to permit installation of other work. Construct and maintain scaffolding in a rigid, secure, and safe manner. Remove it promptly when no longer required.

1.15 Cutting and Patching

- .1 Execute cutting, fitting, and patching, including excavation and fill, to complete the work.
- .2 Remove and replace defective and non-conforming work.
- .3 Restore work with new products in accordance with requirements of Contract Documents.
- .4 Provide openings in non-structural elements for work for penetrations of mechanical and electrical work.
- .5 Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- .6 Employ original installer to perform cutting and patching for exposed to view materials.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed with masonry materials without prior approval.
- .8 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

1.16 Protection

- .1 Take reasonable and required measures, including those required by authorities having jurisdiction, to protect public and private property from damage. Make full restitution for such harm and damage resulting from failure to take adequate protective measures. Make good damage resulting from failure to take adequate protective measures. Make good damage from whatever cause. Comply with requirements of Construction Safety Act, latest issue.
 - .2 Provide safety helmets for Consultant, Owner and any other authorized visitors to the site if required.
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the site if required.

- .3 Provide guard rails, barriers, and pavement protection as required for protection of public and private property, and as required by law and by authorities having jurisdiction. Erect sturdy railings around shafts, stairwells, and the like to protect workmen and public from injury. Alter, remove and relocate or replace as required, hoardings, barriers, and entrances therein as required by authorities having jurisdiction, and by the Work.
- .4 Provide and maintain guard lights at barricades, railings, obstructions, in streets, roads or sidewalks and at trenches or pits adjacent to public walks or roads.
- .5 Take all necessary precautions to guard site, premises, materials and the public at times other than when supervised work is in progress.
- .6 Provide and maintain in working order, suitable, Underwriter's labelled fire extinguishers and locate in prominent positions, to the approval of authorities having jurisdiction.
- .7 Completely protect all trees existing on adjacent properties except where specified otherwise, indicated otherwise on the Drawings, or instructed otherwise by the Consultant. Protect roots during excavation and grading so that they receive the minimum possible disturbance and damage.
- .8 During the progress of the Work, the Contractor shall be held responsible for full and complete protection of all portions of the building and their contents. Any damage caused by failure of the performance of these requirements must be made good by the Contractor at his own expense to the entire satisfaction of the Owner and the Consultant.

1.17 Signs and Advertisements

- .1 No signs or advertisements of any description, other than notices regarding safety, cautions, and instructions, shall be put around the building or site without the approval of the Consultant.

1.18 Final Inspection

- .1 Contractor's Inspection: the Contractor and all sub-contractors shall conduct an inspection of the work, identify deficiencies and defects; repair as required. Notify the Consultant in writing of satisfactory completion of the Contractor's Inspection and that corrections have been made. Request a Consultant's Review. Provide a written copy of the Contractor's deficiency report with the request for the Consultant's Review.
- .2 Consultant's Review; the Consultants together with the Owner and the Contractor will perform a review of the work to identify obvious defects or deficiencies. The Contractor shall correct work accordingly.
- .3 Declaration of Substantial Performance: when the consultants consider deficiencies and effects have been corrected and it appears requirements of the Contract have been substantially performed, make application for Certificate of Substantial Performance. Refer to General Conditions Article GC 5.4 for specifics to application.

1.19 Maintenance Manuals

- .1 Maintenance Manuals shall be submitted to the Consultant prior to the issuance by the Consultant of the Substantial Performance Certificate.
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the Consultant of the Substantial Performance Certificate.

- .2 Maintenance Manuals shall be submitted to the Consultant in electronic and hardcopy format; one hard copy in matching 3-ring binders and 2 USB's and they shall contain the following documents:
 - .1 Printed or type-written copies of maintenance procedures where indicated in the specifications.
 - .2 All require warranty and guarantee certificates
 - .3 As-Recorded drawings as required elsewhere in this Section
 - .4 Inspection and Verification Certificates
- .3 Each binder shall also contain a complete list of contents and a complete list of subcontractors used for this project and shall include phone numbers, addresses and contact personnel. Each section shall be properly partitioned.
- .4 Refer to Division 15 and Division 16 for additional requirements of maintenance manuals. Required maintenance data is to be included in the manuals noted above.

1.20 As-Recorded Documents

- .1 After award of Contract, Consultant will provide a set of drawings for purpose of maintaining record drawings. Accurately and neatly record deviations from Contract Documents caused by side conditions and changes ordered by Consultant.
- .2 Record locations and as-built elevations of all new exterior underground utilities and services incorporated into the work.
- .3 Record locations of concealed components of mechanical and electrical services.
- .4 Identify drawings as "Project Record Copy". Maintain in new condition and make available for inspection on site by Consultant.
- .5 On completion of work and prior to the issuance by the Consultant of the Substantial Performance Certificate, submit record documents to Consultant in electronic format and hard copy.

1.21 Final Cleaning

- .1 Refer to GC 3.13 of the Standard Construction Document, C.C.D.C. No. 2, 2008.
 - .2 Prior to Substantial Performance, remove surplus products, tools, construction machinery and equipment not required for the performance of the remaining work.
 - .3 Remove waste materials and debris from the site at regularly scheduled times or dispose of as directed by the Consultant. Do not burn waste materials on site, unless approved by the Consultant.
 - .4 Leave the work broom clean before the inspection process commences.
 - .5 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
 - .6 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, carpet and all flooring materials, etc.
 - .7 Vacuum clean and dust building interiors, behind grilles, louvres and screens, and light fixtures.
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- .8 Wax, seal or prepare floor finishes, as recommended by the manufacturer. Co-ordinate final application of wax and sealers with Owner's maintenance staff. Supply listing of products and instructions.

- .9 Final cleaning requirements beyond the "broom clean" requirement noted in this sub-section is to be performed by the General Contractor's cleaning contractor. All co-ordination and charges shall be the responsibility of the General Contractor. The complete building shall be cleaned to highest standard, to allow the Owner to occupy the building without further cleaning by Owner's staff.

PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.____

1.2 Related Work

- .1 Section 02510 Water Distribution
- .2 Section 02530 Sanitary Sewerage
- .3 Section 02630 Storm Drainage
- .4 Section 03300 Cast-in-Place Concrete

1.3 Work Included

- .1 The work covered by this Section includes, but is not necessarily limited to:____
 - .1 Clearing and stripping of all vegetation, topsoil and debris within the limits of the proposed building area, driveways, parking areas and other areas indicated on the Drawings.
 - .2 Excavations for the construction of foundations, sidewalks, structures and other site features.
 - .3 Excavations for granular bases under asphalt paving and parking areas.
 - .4 Proof-rolling of the sub-grade prior to the placing backfill materials.
 - .5 Unwatering, backfilling and compaction of backfill material around foundations, sub-structures and under slabs on grade.
 - .6 Unwatering, backfilling and compaction of backfill material and sub-base under asphalt paving and parking areas.
 - .7 Rough grading around buildings and the site under all sodded and seeded areas.
 - .8 Final grading around the site for areas not requiring sodding or seeding (see notes on drawings).
 - .9 Removal and disposal of all surplus excavated materials.

1.4 Work Excluded

- .1 Excavation, backfilling and compacting of backfill material for mechanical and electrical work is specified elsewhere.
- .2 Final layer of topsoil for sodded and landscaped areas is specified elsewhere.
- .3 Asphalt paving surfaces are specified elsewhere in these specifications.

1.5 Requirements of Regulatory Agencies

- .1 All fill materials shall conform strictly to the specifications of the Ontario Provincial Standard Specifications.
 - .2 In addition to the requirements of local authorities, shoring and trenching shall conform to all applicable regulations of The Occupational Health and Safety Act, 1991 Regulations for Construction Projects of the Province of Ontario (or its latest revisions) and the Ontario Ministry of Labour.
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1.6 Quality Control

- .1 Inspection and testing will be carried out by an independent inspection and testing company appointed by the Consultant. Cost of such inspection and testing shall be paid for by the Testing and Contingency Allowance.
- .2 The appointed inspection and testing company shall sample and test a maximum of two sources of fill material. If both sources are rejected, the cost of lab sampling and testing subsequent sources, until an approved source is obtained, shall be paid for by the contractor of this Section.

1.7 Job Conditions

- .1 Notify Public Utility and/or Municipal Authorities in advance of planned excavations adjacent to their services.
- .2 Take care not to damage or displace encountered services.
- .3 When such services are encountered during the execution of work, immediately notify the Owner and protect, brace and support active services. Where repairs to services damaged by the Contractor become necessary, repair at no additional cost to the Contract.
- .4 In the case of damage to, or cutting off of an essential service, notify Owner immediately and repair the service under the Consultant's direction.
- .5 Inform the Owner about encountered services requiring adjustment, relocation or abandonment to arrange for disconnection and capping of service.

PART 2 - PRODUCTS

2.1 Materials

- .1 Granular "A" material: clean, hard, durable, crushed rock or gravel particles free from lumps of clay, conforming to O.P.S.S. Form 1010.
- .2 Granular "B" material: with grain size conforming to O.P.S.S. Form 1010, or a selected granular material with a maximum size of 4" (100mm) and maximum 5% passing the #200 sieve, approved by the Consultant.
- .3 Crushed stone: clean, hard, durable, coarse gravel, or crushed rock fragments such that 100% of the particles pass the 3/4" sieve and not more than 10% of the particles pass the #4 sieve. No clay or other objectionable materials shall be present.
- .4 Concrete backfilling: 15 MPa (2000 psi).

PART 3 - EXECUTION

3.1 Preparation

- .1 All vegetation, topsoil and debris shall be cleared and stripped from the site before commencing construction.
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- .2 Stockpile topsoil neatly out of the way of construction operations for future re-distribution.

3.2 Excavation

- .1 Remove all topsoil, earth, rock, snow, ice, frozen ground and any other materials necessary to allow the construction of foundations, substructures and parking areas. Keep bottoms of excavations free of all loose materials.
- .2 Excavated material that is approved for backfilling operations shall be neatly stockpiled out of the way of construction operations for later use. All other excavated material shall be removed and disposed off site.
- .3 Supply all necessary sheet piling and bracing required to prepare the excavations for subsequent operations.
- .4 Excavations for foundations shall extend a minimum of one foot beyond the edges of all footings, and shall be levelled off and tamped solid, taking care not to excavate too low. Excavations which are carried deeper than shown on the Drawings will require backfilling with concrete, from same pour as footings above, to proper elevations, at no additional costs to the Contract.
- .5 If the excavations reveal seepage zones, springs or other unexpected subsurface conditions which may necessitate revisions or additions to any drainage system, notify the Consultant immediately before proceeding with the work.
- .6 Do not disturb the bottom of excavations in any way that may adversely affect the load bearing value.

3.3 Unwatering Excavations

- .1 The Contractor shall at all times keep all excavations and trenches dry and free from water at his own expense, and shall build all dams, water-courses, and other work necessary for this purpose and provide and keep in operation on the Work, when necessary, pumps of sufficient capacity for the purpose.
- .2 The Contractor shall provide for the disposal of water removed from the excavation in such a manner as shall not be a danger to the public health, private property, or to any portion of the Work completed or under construction, either by him or by any other contractor.

3.4 Inspection, Field Sampling and Testing

- .1 All footing excavations shall be inspected and tested by the appointed inspection and testing company prior to placing concrete.
 - .2 The Contractor shall notify the inspection and testing company at least twenty-four hours before each inspection is required.
 - .3 Where, in the opinion of the appointed inspection and testing company and/or the Consultant, adequate bearing cannot be obtained at the depths shown on the Drawings, additional excavation to greater depths may be authorized by the Consultant. If such authorization is given, payment for the additional excavation will be made in accordance with Section 0102 Supplementary General Conditions.
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3.5 Proof-Rolling

- .1 Prior to placing the granular base and backfill material for all areas and after all topsoil, soft and otherwise compressible material is removed from the ground surface, the exposed subgrade shall be proof-rolled to compact any loose surface stones or to detect spongy areas which may need sub-excavation.

3.6 Backfilling

- .1 Interior backfill: immediately under slabs on grade and site structures shall be Granular "A" backfill as indicated on the drawings. Balance of the interior backfill to the u/s of the base noted above shall be Granular "B".
- .2 Exterior backfill (within building excavations): under paved areas, parking areas and sidewalks to the u/s of the granular base noted on the drawings shall be granular "B". Refer to the drawings for additional requirements.
- .3 Exterior backfill: under sodded and landscaped areas to the u/s of the subbase shall be on-site material that is clean and free from plaster, batts, and other debris.
- .4 Promptly backfill excavations as the work proceeds but not before concrete or masonry walls and pedestals and other structural concrete and masonry have attained full design strength. Backfill evenly on both sides of foundation walls to avoid unequal pressure on walls.
- .5 In backfilled areas and trenches which will be under floor slabs, sidewalks, roadways, etc., the Contractor shall provide and use special mechanical compacting equipment, suitable for use in confined spaces, and shall place the backfill materials maximum 8" (200mm) deep layers, and compact each layer to 100% of Standard Proctor Density. When necessary, apply water, in amounts as directed by the Consultant, to the backfill materials to be compacted to achieve the designed amount of compaction.
- .6 In backfilled areas which will be under floor slabs, deposit and consolidate fill as required to bring the level up to the elevation of the underside of granular base.
- .7 Fill shall be free from snow and ice and in no instance shall fill be placed on snow or ice covered frozen ground.

3.7 Grading

- .1 Upon completion of backfilling and before commencing with grading, remove debris from the work site. Perform grading within the limits shown on the Drawings to bring ground surfaces to finish subgrades.
 - .2 Subgrades shall be uniform levels or slopes between points where elevations are given and between such points and existing grade levels.
 - .3 After a period, adequate to reveal settlement, has passed, as determined by the Consultant, additional fill shall be placed and compacted in all depressions to the Consultant's satisfaction, and any subsequent settlement shall be made good without any additional cost to the Contract.
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3.8 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.

PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 02315 Excavating, Backfilling, Compacting and Rough Grading
- .2 Section 03371 Concrete Floor Slab on Grade
- .3 Section 04200 Unit Masonry
- .4 Section 05120 Structural Steel
- .5 Section 05500 Metal Fabrications
- .6 Section 06100 Rough Carpentry
- .7 Section 07210 Building Insulation

1.3 Reference Standards

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1-94, CAN/CSA-A23.1-94, CAN/CSA-A23.1-94 and ANSI/ACI315-80, and testing in accordance with CAN3-A23.2-94, except where specified otherwise.

1.4 Work Included

- .1 The items covered by this section include if shown on the Drawings but are not limited to underpinning, caissons, pole bases, curb and gutter, manholes, catchbasins, headwalls, sidewalks, retaining walls, footings, pile caps, foundation and superstructures walls, piers, pilasters, columns, beams, girders, arches, suspended floor and roof slabs, pits, trenches, stairs, filling of beam and column pockets, and encasement of steel beams and columns and concrete topping over precast structural concrete.
- .2 Also included in this section when applicable are: Grouting under steel column bases, pre-moulded joint fillers, water stops, pre-formed or saw-cut control joints in walls, and sealing control joints with joint sealant.

1.5 Source Quality Control and Samples

- .1 Upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 5 weeks prior to commencing reinforcing work.
 - .2 Upon request only, and at least 4 weeks prior to commencing work, inform Consultant of proposed source of reinforcing steel, aggregates, and cement and all proposed admixtures, and provide access for sampling.
 - .3 Before ordering any concrete, the Contractor shall obtain from the ready-mix manufacturer and submit to the Consultant for approval, recent test reports from an approved testing laboratory on samples of materials and concrete taken from the ready-mix supplier, and a statement giving the proportions by dry weight of cement, and fine and coarse aggregates that will be used in the manufacture of each class of concrete to be ordered by the Contractor.
 - .4 In case of doubt as to the quality of the concrete provided by the proposed
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- .4 In case of doubt as to the quality of the concrete provided by the proposed supplier, the Consultant may, at his option, order the Contractor not to use the concrete on the Work from such proposed supplier and the Contractor shall arrange for another acceptable source of supply.
- .5 Equipment used for mixing or agitating concrete shall be clean and in good mechanical condition. Trucks may be subject to examination and individual approval by the Consultant to check for accumulation of hardened material, blade wear, water gauging, general condition and efficiency, etc.
- .6 The proportions of materials shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around the reinforcement. The mix proportions shall be such that the concrete will not easily segregate or cause excess free water to collect on the surface.
- .7 The slump test shall be used as a guide to workabilty, and to control the consistency of the concrete, especially from batch to batch. The value of slump for reinforced concrete within vertical formwork such as walls or beams shall be 3" (75mm) plus or minus 1" (25mm), and for all other concrete shall be 2 1/2" (64mm) plus or minus 1" (25mm) unless otherwise approved by the Consultant.
- .8 All exposed exterior concrete shall be air entrained unless approved otherwise by the Consultant. A sufficient air entraining agent shall be added to the concrete mix to provide the total air content as shown in the following table. Determination of total air content shall be made by means of an air meter of approved design at the point of placing.

<u>Nominal Maximum Size of Course Aggregate</u>	<u>Total Air Content</u>
.1 1 1/2" (37.5mm)	5.5% +/- 1.0%
.2 1" (26.5mm)	5.5% +/- 1.0%
.3 3/4" (19mm)	6.0% +/- 1.0%
.4 1/2" (13.2mm)	7.0% +/- 1.0%
.5 3/8" (9.5mm)	8.0% +/- 1.0%

1.6 Field Quality Control

- .1 All operations relating to mixing, placing, and curing shall be controlled by the Consultant. The Contractor shall provide unhindered access to the work for purposes of inspection and selection of samples. The Contractor shall provide the necessary protection for the specimens against injury or loss.
- .2 All concrete sampling and testing shall be carried out by an independent inspection and testing company appointed by the Consultant, and paid for out of the Testing Allowance (see Section 00800 Amendments to and Supplementary General Conditions). Note that re-testing of materials required due to failure to meet the requirements of this specification shall be paid for directly by the Contractor and not out of the Testing Allowance. Send copies of the concrete test reports to the concrete supplier, the Contractor, and the Consultant.
- .3 The Contractor shall notify the inspection and testing company twenty-four hours before each concrete placing operation.
- .4 During the progress of the Work, make concrete compression test specimens from concrete being used in the construction. Store, cure, and test specimens to CAN3-A23.2-M94.

- .5 For each strength test, make three compressive strength test cylinders. Test one cylinder at 7 days; test the remaining two cylinders at 28 days.
- .6 For building structures, make not less than one strength test (three cylinders) for each 75 cubic meters of concrete, but in no case shall there be less than one strength test made for each class of concrete placed on any day.
- .7 For sidewalks, curbs, pole bases, catchbasins, manholes, distribution structures, headwalls, and other appurtenances, the number of strength tests shall be at the discretion of the Consultant.
- .8 For all types of construction where the time of removal of formwork is being controlled by strength tests, additional tests may be required.
- .9 Regularly control the consistency of concrete by means of slump tests. In no case shall there be less than one slump test taken for each strength test made.
- .10 Make one air test at the same time as, and from the same pour of concrete as, each slump test is made.
- .11 If the 7-day strength of any test specimen falls below 50% of the specified 28-day strength, the Consultant will inform the Contractor and may require that additional curing operations be implemented immediately on those portions of the structure represented by that specimen. The cost of any additional such curing shall be borne entirely by the Contractor.
- .12 To conform to the strength requirements of this specification, the average of all 28-day tests for each class of concrete shall exceed the specified strength, and no individual 28-day test shall fall below 80% of the specified strength. If this criteria is not met, the Consultant shall have the right to require one or more of the following be done, at the sole expense of the Contractor:
 - .1 Changes in the mix proportions for the remainder of the Work.
 - .2 Additional curing on those portions of the structure represented by the test specimens which failed.
 - .3 That cores be drilled (from the portions of the structure in question) and tested in accordance with CAN3-A23.2-M94.
 - .4 Non-destructive testing of the structure or structural elements shall be in accordance with CAN3-A23.2-M94.
- .13 If, after the above requirements have been carried out, the Consultant is not satisfied that the concrete in the structure is of the specified quality, he may demand a strengthening or replacement of those portions in which the concrete failed to develop the required strength. The costs of such strengthening or replacement shall be borne entirely by the Contractor.

1.7 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01000 General Requirements. Reinforcing steel shop drawings consist of bar bending details, lists and placing drawings.
 - .2 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and mechanical splices, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacing and location of chairs, spacers and hangers. Do drawings in accordance with Reinforcing Steel Manual of Standard Practice, by Reinforcing Steel Institute of Ontario.
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- .3 Design and detail lap lengths and bar development lengths to CAN3-A23.3-M94, unless otherwise indicated. Provide type C tension lap splices unless otherwise indicated.
- .4 The Consultant will require the formwork contractor to have falsework drawings prepared and submitted for review for all slab, beam, girder, and arch forming, or other forming requiring shoring and falsework.
- .5 Submitted form and falsework drawings shall bear the seal of a qualified Professional Engineer registered in the Province of Ontario.

1.8 Formwork Design

- .1 The design and engineering of the formwork, as well as its' construction, shall be the responsibility of the Contractor. Forms shall be of sufficient strength and rigidity to support all concrete and construction loads and wind, taking into account proposed rate and method of pouring concrete so that the resultant finished concrete shall conform to the shapes, lines and dimensions of the members shown on the drawings.
- .2 The formwork shall be designed for the loads and lateral pressures outlined in the ACI publication "Formwork for Concrete SP4" and wind pressures and allowable stresses as set down in the current Ontario Building Code.

PART 2 - PRODUCTS

2.1 Materials

- .1 Design and produce all concrete to develop a compressive strength of 20 MPa (3000 psi) at 28 days except as noted: exterior sidewalks, slabs, curbs and concrete topping over precast structural concrete shall be 25 MPa at 28 days, minimum cement content 350 kg/meter cubed. Air content shall be 4% except for trowelled interior slabs and footings.
 - .2 Formwork lumber: plywood and wood formwork materials to CAN/CSA-086.1-M94, CSA/CAN3-086-M84.
 - .3 Falsework materials: to CSA S269.1-1975.
 - .4 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 1" (25 mm) dia in concrete surface.
 - .5 Form liner:
 - .1 Plywood: Douglas Fir to CSA 0121-M1978, no. 2 grade, square edge, 11/16" (17mm) thick.
 - .6 Form parting agent: non-staining mineral oil or chemically active release agent containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to all form types:
 - .1 Acceptable chemical release agent materials: Sealtight "Duoguard" by W.R. Meadows or approved alternative.
 - .7 Column forms: 'Light column forms' as manufactured and supplied by EFCO. See drawings for diameter and height.
 - .8 Reinforcing steel: billet steel, grade 400, deformed bars to CSA G30.14-M1983 unless indicated otherwise.
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- .9 Cold-drawn annealed steel wire ties: to CSA G30.3-M1983.
 - .10 Welded steel wire fabric: to CSA G30.5-M1983. Provide in flat sheets only. Refer to drawings for sizes.
 - .11 Welded deformed steel wire fabric: to CSA G30.15-M1983. Provide in flat sheets only.
 - .12 Chairs (for welded steel wire fabric support): shall be Class A, HC (High Chair), Type B, standard finish. Height of chair to be as such to allow 2" (50mm) concrete cover over wire fabric.
 - .13 Bolsters, bar supports, spacers: to CAN3-A23.1-M94, CAN3-A23.2-M94.
 - .14 Mechanical splices: subject to approval of Consultant.
 - .15 Cement: normal Portland cement to CAN/CSA-A5-93, CAN/CSA-A8-93 and CAN/CSA-A362-93.
 - .16 Fine and course aggregates: to ASTM C33-93. Nominal maximum size of course aggregate shall be 3/4" (19 mm) unless another size is approved in writing by the Consultant.
 - .17 Water for making concrete and grout: clean, potable, and free from oil, acid, alkali, organic matter or other deleterious substances.
 - .18 Air entraining admixtures: to CAN3-A226.1-M78
 - .19 Grout for column base plates: approved pre-mixed, non-metallic, non-shrinking type having a 28 day compressive strength of 8000 psi (55 MPa) minimum.
 - .20 Membrane-curing compounds (when approved for use): oil and wax free 100% resin base compounds to ASTM-C309-94.
 - .21 Waterstops: Extruded PVC to ASTM D412-92, ASTM D624-91, and HEPC Spec. M264, of types and sizes shown on the drawings. Straight splices, mitred corners, tees, and crosses shall be accurately cut and fused together with heating irons in strict compliance with manufacturer's instructions.
 - .22 Joint sealant: approved non-sag polysulphide type suitable for interior or exterior use in moving or static joints.
 - .23 Pre-moulded filler (backing for joint sealant): non-extruding and resilient unicellular foamed plastic compatible with with polysulphide sealant.
 - .24 Dovetail anchor slots: minimum 24 gauge galvanized steel with insulation filled slots.
 - .25 Non-slip strips: non-slip abrasive cement strip filler shall be two parts fine aluminum oxide to one part cement, in colour selected by the consultant. Non-slip channel inserts shall be zinc, 10mmx10mmx20 gauge, dovetail shaped channels with anchors.
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PART 3 - EXECUTION

3.1 General

- .1 Before commencing any work, examine existing work and the work of other trades, and verify the locations and elevations of excavations and other existing work. Immediately notify the Consultant of any failure of the building components to fit together properly. Corrective measures shall be undertaken only as approved by the Consultant.
- .2 The Contractor shall examine both the contract drawings and the shop drawings pertaining to other trades, and shall make provisions for the installation of all necessary anchors and anchorage devices, inserts, sleeves, bolts, bearing plates and assemblies, and all other items specifically shown as being embedded in concrete members.
- .3 The Contractor shall notify the Consultant of his intentions to place concrete for any part of the Work at least 48 hours before placement to allow the Consultant to inspect the applicable formwork, falsework, reinforcing steel, and site preparation and conditions.

3.2 Formwork Erection

- .1 Handle and store forming materials on the job site in such a manner that no damage will be caused to the material, to existing structures on the site, and to the work of other trades in progress.
 - .2 Forms shall conform to the shape, line and dimensions of the members called for on the plans. They shall be substantial and sufficiently tight to prevent the leakage of mortar, and shall be properly supported, braced, and tied, so as to maintain position and shape to a tolerance of plus or minus 1/8" (3 mm) for columns and beams and a non-accumulative tolerance of 1/8" (3 mm) in 10'-0" (3 m) for walls and floor slabs.
 - .3 All forms shall be constructed with stiff framing members in two directions. Horizontal walers shall be at least double 2" x 4" (38 x 89) at the top of forms and in all form tie positions.
 - .4 Supports for forms shall be constructed so that they will not deflect under the weight of the wet concrete or other loads incidental to construction. Shores supporting forms for slabs, beams, girders or arches shall be set on wedges or other approved supports in order that they may be removed without producing undue strains or shock in the superstructure.
 - .5 Exposed corners of all beams and columns shall be chamfered 1" (25 mm) nominal each face unless otherwise directed.
 - .6 Surfaces of formwork which will be in contact with concrete shall be coated with parting agent before reinforcing steel is placed. Take care to ensure that no parting agent comes in contact with reinforcing steel or embedded inserts.
 - .7 Parting agents shall not be used on forms for concrete which will receive a plaster finish.
 - .8 Provide temporary openings at the base of columns, wall forms, and other places where necessary to facilitate cleaning and inspection. Place openings so that water and remaining debris shall have a clear run to the outside of the form.
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- .9 Immediately prior to pouring, all forms shall be inspected by the Consultant to ensure that they are properly placed, sufficiently rigid and tight, thoroughly clean, properly treated, and free from snow, ice or other foreign material.
- .10 Install continuous, vertical dovetail anchor channels on the face of all concrete columns abutting masonry work, and at 32"(800 mm) o.c. on the faces of all concrete walls backing masonry work.
- .11 As an alternative, the Contractor may, at his option, employ approved metal forms for forming of unexposed work only.

3.3 Bending of Reinforcing

- .1 Bend reinforcing steel accurately to suit the concrete dimensions indicated on the drawings and the protective cover requirements of this specification. Make all bends cold.
- .2 Minimum inside radius of bends for stirrups, and beam and column ties shall equal one bar diameter.
- .3 Minimum inside radius of bends for all other bars shall be as shown in the following table, except that for standard hooks for bar sizes 10M to 30M inclusive, the minimum radius may be equal to 5 bar diameters, and for standard hooks for bar sizes 35M to 55M inclusive, the minimum radius may be equal to 10 bar diameter for grade 300 MPa steel:

Bar Size Min.	Bending Inside Radius
.1 10M & 15M	2 1/2 bar diameters
.2 20M & 25M	3 bar diameters
.3 30M & 35M	4 bar diameters

3.4 Placing Reinforcing

- .1 Handle and store reinforcing steel on the job site so that no damage will be caused to the material, to the existing structures on the site, and to the work of other trades in progress. Store reinforcing steel on wood blocking above ground and keep free of mud, oil, and other foreign matter.
- .2 Free reinforcing steel of dirt, scale, or other coatings that will destroy or reduce the bond at the time of concrete placement. Where there is a delay in placing concrete, reinforcing steel shall be re-inspected by the Consultant and cleaned when necessary.
- .3 Place reinforcing steel accurately and secure in position adequately using concrete or steel chairs or spacers and annealed iron tie wires. Brick, wood, tile, etc. shall not be used. At outside surfaces, bend tie wire ends inward to give at least the same cover as required for reinforcing steel.
- .4 Splices shall provide sufficient lap to transfer the stress between bars by bond and shear. The clear distance between bars shall also apply to the clear distance between a contact splice and adjacent contact splices or bars. In slabs, beams, and girders, avoid splices of reinforcement at points of maximum stress.

- .5 The minimum clear distance between parallel bars, except in columns, shall equal the nominal diameter of the bars. In no case shall the clear distance between be less than 1" (25 mm) nor less than one and one-third times the maximum size of the course aggregate. Where reinforcing steel between beams and girders is placed in two or more layers, the clear distance between the layers shall not be less than one inch, and the bars in the upper layers shall be placed directly above those in the bottom layer.
- .6 The reinforcing steel for footings and other principal structural members in which the concrete is deposited against the ground shall have not less than 3" (75 mm) of concrete between it and the ground contact surface. If concrete surfaces after removal of the forms are to be exposed to the weather, or to be in contact with the ground, the reinforcing steel shall be protected with not less than 2" (50 mm) of concrete for bars more than 5/8"(16 mm) diameter, and 1 1/2" (40 mm) for 5/8"(16 mm) diameter bars or smaller.
- .7 The concrete cover for reinforcing steel at surfaces not exposed directly to the ground or weather shall be not less than 3/4" (20 mm) for slabs and walls and not less than 1 1/2" (40 mm) for beams, girders, and columns. In concrete joist floors in which the clear distance between joists is not more than 2'-4" (700mm), the protective covering for reinforcing steel shall be at least 3/4" (20mm).
- .8 Concrete cover for reinforcing steel shall in all cases be at least equal to the diameter of the round bars.

3.5 Placing Fabric Reinforcing

- .1 Place fabric reinforcing accurately and secure in position using steel chairs specified and annealed tie wires. Fabric to sit on chairs spaced in a 24" (600mm) grid each way. The fabric reinforcing shall be lapped 6" (150mm) minimum and tied securely to the chair.

3.6 Ready Mixed Concrete

- .1 Deliver the concrete to the site of the work and complete the discharge within one and one-half (1 1/2) hours after the introduction of the mixing water to the cement and aggregates. In hot weather, or under conditions contributing to quick stiffening of the concrete, or where high early cement is used, or where the temperature of the concrete is 27 degrees C or above, this time shall not exceed 45 minutes.
 - .2 When the concrete is mixed in a truck mixer, the mixing operation shall begin within 30 minutes after the cement has been intermingled with aggregates.
 - .3 Do not haul ready mixed concrete more than 50 km in order to reach the Work, regardless of the time involved.
 - .4 The approved Ready-Mixed Concrete Operation shall be equipped with suitable and adequate heating equipment capable of heating the stockpiles of aggregates, the batch bins and mix water, as required. If not, the operation will be approved for summer use only. This equipment shall be available in working order at all times when needed between October 1 and May 1.
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- .5 Convey concrete from the mixer to the place of final deposit at a uniform rate, by methods which will prevent the separation or loss of materials. Size and design equipment for chuting, pumping, and pneumatically conveying concrete to ensure a practically continuous flow of concrete at the delivery end without separation of materials. Conveying equipment shall be thoroughly flushed with water before and after each run and the water used for this purpose shall be discharged outside the forms.
 - .6 When concrete pumps are used to place concrete, the required slumps as specified in this section may be increased 1" (25 mm) for each 100' (30 m) of piping through which the concrete is pumped, but the maximum slump measured at the pump shall not exceed 6" (150 mm). The Contractor shall arrange with the ready mix supplier, and pay any additional costs required, for mix designs which will maintain the required strength of concrete pumped at high slump.
 - .7 Wet down all forms thoroughly before depositing concrete, except in freezing weather. Use no chemicals to free ice from the hardened concrete in the forms.
 - .8 Deposit concrete in the forms as nearly as practicable in its final position to avoid rehandling, and in approximately horizontal layers. The vertical height of free fall shall not exceed 5'-0" (1500 mm).
 - .9 Carry on the concreting at such a rate that the concrete is at all times plastic and flows readily into the spaces between reinforcing steel. No concrete that is partially hardened or has been contaminated by foreign material shall be deposited in the work, nor shall retempered concrete be used. Do not deposit concrete during rain unless adequately protected, and in any case shall be protected from rain until it has cured sufficiently so that it will not be damaged.
 - .10 Carry on the concreting as a continuous operation until the placing of the panel or sections is completed in such a manner that fresh concrete will not be deposited on concrete which has hardened sufficiently to cause formation of seams and planes or weakness within the section. Maintain the top surface generally level. Make construction joints as required, in accordance to this section.
 - .11 Compact all concrete thoroughly by suitable means during placing, and compact around the reinforcing steel and embedded fixtures and into the corners of the forms.
 - .12 Compact all concrete (unless otherwise permitted by the Consultant) by mechanical vibrators for internal use in the forms. Where walls are thin, or heavy reinforcement obstructs the use of an internal vibrator, or for surfaces relatively inaccessible from within, use external vibrators. Maintain at least one extra vibrator on the site as a standby unit. If vibrators are electrically powered, a standby generator will be required.
 - .13 Operate internal vibrators at a speed of not less than 3600 impulses per minute. Apply vibrators at the points of deposit and in the area of the freshly placed concrete. Allow vibrator to sink of its own weight in the concrete until it penetrates to the previous layer of concrete; withdraw immediately at the same speed at which it sank, and then move about 12" (300mm) to a new location, and repeat the process. Take care that the reinforcing steel and attached fittings are not disturbed.
 - .14 External vibrators may be chipping hammers applied to the walls of the forms, and moved progressively as the forms are filled with concrete. Fit the chipping hammers with a 2" x 2" (50mm x 50mm) steel plate to bear against the forms.
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- .15 Take care that vibration of concrete is not continued after capillary continuity has been achieved as indicated by the glistening of a film of water at the top surface of the concrete.
- .16 Do not use the vibrators to move the fresh concrete within the forms.

3.7 Construction Joints

- .1 Locate joints not indicated on the drawings so as to least impair the strength and appearance of the structure. The location of construction joints subject to the approval of the Consultant.
- .2 Where a joint is to be made, the surface of hardened concrete shall be roughened and thoroughly cleaned of foreign matter and laitance, and shall be thoroughly wetted with water but not saturated, and the forms retightened against the face of the hardened concrete before depositing additional concrete. An excess of mortar on hardened surfaces shall be secured by first placing a 2" (50mm) layer of cement-sand mortar. Into this mortar layer, the regular mix concrete shall be deposited immediately. The cement-sand mortar shall be of the same proportions as the regular concrete mix, except that the coarse aggregate is omitted.
- .3 Construction joints in walls shall be vertical and located so as to least impair the strength of the structure. Bulkheads forming construction joints shall be tight and truly vertical. Vertical construction joints in walls shall be made at control joints, if control joints are indicated on the drawings.
- .4 Make horizontal construction joints in walls only where indicated on the drawings or in the specifications. To ensure a level, straight joint on the exposed surface of the walls, use the following: set level a strip of 1" (25mm) square edged lumber and tack to the forms at the outside surface of the wall. Carry the concrete about 1/2" (12mm) above the underside of the strip. About one hour after the concrete has been placed, remove the strip. Level off any irregularities in the joint line with a screed.

3.8 Finishing Unformed Surfaces

- .1 The tops or other exposed unformed surfaces of concrete placed in all types of structures shall conform accurately to the grades and elevations shown on the drawings.
 - .2 Finish all unformed surfaces by screeding followed by floating.
 - .3 These surfaces are to be free from open texturing, plucked aggregates, local projections, and shall be such that when tested with a 10'-0" (3m) long straight edge (provided by the Contractor at his own expense) placed any where in any direction on the surface, there shall be no gaps greater than 1/8" (3mm) between the bottom of the straight edge and the surface of the concrete. No variation will be permitted across any joint.
 - .4 At the Contractor's expense, rectify areas that do not meet the required surface accuracy as follows: grind down any areas higher than 1/8" (3mm) above the correct surface. Correct any areas lower than 1/8" (3mm) below the correct surface by grinding down the adjacent high areas. All grinding shall be carried out by an approved machine of a type and capacity suitable for the total area of grinding involved until the surface meets the specified requirements.
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- .5 Screeding shall consist of moving a straight edge or template with a sawing motion along wood or metal strips established as guides. This shall be done immediately after consolidation of the concrete to give the surface its approximate shape and elevation.
- .6 After screeding, bring the surface to the specified uniformity and accuracy with a wood float held in a floating position and worked in a circular or sawing motion slowly from one side of the surface to the other and back again.

3.9 Finishing Formed Surfaces

- .1 Immediately after the removal of forms, remove or cut back all bolts, ties, nails, or other metal not required for construction purposes, to a depth of 1" (25mm) from the surface of the concrete.
- .2 Moisten all cut-out areas with water and fill completely with a stiff mortar of cement and fine aggregate in the proportions of the concrete being finished.
- .3 Do not repair honeycombed areas discovered after the removal of the forms until inspected by the Consultant. In non-structural elements, cut out the affected honeycombed area and fill with mortar as previously described. In structural elements, the method of treatment of the honeycombing shall be as directed by the Consultant.
- .4 Neatly chip off and rub off fins, unsightly ridges, or other imperfections flush with the general surface. Rub all concrete surfaces to be left exposed with course carborundum brick to produce a surface that is perfectly straight, smooth and free from marks, roughness and stains.
- .5 The appearance of the finished concrete shall be uniform as to colour, pattern and texture when viewed from a distance of 50'-0" (15m). If this appearance is not achieved by the methods specified above, additional treatment will be required at the Contractor's expense and as directed by the Consultant.

3.10 Curing Unformed Surfaces

- .1 After the concrete has set sufficiently, keep the exposed surfaces continuously moist for at least 7 consecutive days after placing when normal Portland or sulphate-resisting cements are used, and for at least 3 consecutive days when High Early Strength Portland cement is used.
- .2 Cure all unformed concrete surfaces using burlap and water unless otherwise approved.
- .3 Water for curing: clean and free from any materials which will cause staining or discolouration of the concrete.
- .4 The Consultant may permit curing by use of a moisture vapour barrier or a membrane compound where, in his opinion, either procedure will adequately cure the concrete.

3.11 Curing Formed Surfaces

- .1 If the formwork is left in place for 7 days, no additional curing will be required. If the formwork is removed in less than 7 days, cure the concrete in the manner specified for unformed surfaces.
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3.12 Grouting Column Bases

- .1 Complete the grouting of column bases before structural dead loads cause local overstress of the supporting concrete and before concrete floor slabs are placed. Mix pre-mixed non-shrink grout in accordance with manufacturer's directions and flow grout into position from one side of the base plate using a "head-box" to create pressure. After placing, cure the grout with wet burlap for 4 days.

3.13 Cold Weather Requirements

- .1 When the surrounding air temperature is lower than 4 degrees C, pre-heat all aggregates and water to arrive at the Work having a temperature not less than 15 degrees C, nor greater than 32 degrees C, unless otherwise permitted in writing by the Consultant.
 - .2 Where the anticipated minimum air temperature is 4 degrees C or falls only a little below for a short period of time, and the concrete is protected from high winds by virtue of its location relative to the atmosphere such as in an excavation, or by other means, such as tarpaulins or sheeting securely covering the Work, provide normal curing only as required by this Section.
 - .3 Where the anticipated minimum air temperature is between -1 degree C and 4 degrees C or falls only a little below -1 degree C for a short period of time, make the following provisions:
 - .1 Cover formed surfaces with securely tied or fastened, and overlapping tarpaulins, or sheeting, to provide a dead air space adjacent to the formwork.
 - .2 Cover unformed surfaces with tarpaulins, waterproof kraft paper, or polyethylene sheeting (4 mil minimum) as soon after placing concrete as possible. Cover this covering with 6" (150mm) of tightly packed dry straw or equivalent thickness of dry insulation. This insulating material shall be kept dry at all times by covering with water-proof sheeting or by other means.
 - .4 Where the anticipated minimum air temperature is below -1 degree C and will remain below -1 degree C for long periods of time, make the following provisions:
 - .1 Protect ground surfaces (on which concrete will be placed) from freezing immediately after excavation with tightly packed dry straw or other dry insulating material of thicknesses as approved by the Consultant for the ambient conditions.
 - .2 Construct weather tight protective housings around the Work and keep the housings clear of the concrete a minimum of 12" (300mm) all around to permit free circulation of air over all parts of the Work.
 - .3 Defrost all reinforcing, forms, and ground surfaces (which will be in contact with the concrete) before placing any concrete in the Work.
 - .4 Keep the concrete within the housing at a temperature of 10 degrees C for not less than 7 days after placing. Keep the relative humidity in the housing above 95%. The housing, covering, and/or other methods used for protection shall remain in place and intact for at least 24 hours after artificial heating is discontinued.
 - .5 As an alternative to maintaining the atmosphere within the housing at a relative humidity of not less than 95%, provide normal curing within the housing as specified in this Section, and in addition, keep wooden formwork wetted at all times.
 - .6 Adequately vent hot air blowers (used for providing heat within the housing) to prevent the accumulation of carbon dioxide within the housing.
 - .7 The use of salamanders, coke stoves, oil or gas burners and similar spot heaters which have an open flame and intense local heat, shall not be permitted.
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- .5 If approved in writing by the Consultant, calcium chloride in quantity not exceeding 2% by weight of the cement may be used in concrete mixes to prevent freezing in cold weather. The use of and quantity of calcium chloride to be added will be determined by the Consultant. Calcium chloride shall not be used with alkali-sulphate resisting cement, or where other additives are used.

3.14 Removal of Formwork

- .1 Forms and shoring shall not be removed until the concrete has gained the strength to carry its own weight together with any superimposed load that may come upon it.
- .2 Vertical forming such as wall, column, and beam and girder side forming shall be left in place for at least 48 hours (with the exception of slip forms).
- .3 Horizontal forming and shoring supporting curing concrete shall not be removed until written permission is received from the Consultant.
- .4 Removal of forming shall proceed with care so that concrete edges and surfaces are not damaged.

3.15 Non-Slip Inserts

- .1 Install non-slip channel strip where indicated on the drawings.
- .2 Install abrasive strip filler into channels to CSC/TTMAC recommendations.

3.16 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL -

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 02315 Excavation, Backfilling, Compacting and Rough Grading
- .2 Section 03300 Cast-in-Place Concrete
- .3 Section 05120 Structural Steel
- .4 Section 05500 Metal Fabrications
- .5 Section 06100 Rough Carpentry
- .6 Section 07211 Building Insulation
- .7 Section 09310 Ceramic Tile

1.3 Work Included

- .1 The work covered by this section includes but is not necessarily limited to the supply and installation of concrete floor slabs on grade, under slab vapour barrier and rigid insulation concrete floor finishing, including hardening and application of cure and seal products.

1.4 Reference Standards

- .1 Place and finish concrete floor slabs on grade in accordance with CSA A23.1 except where specified otherwise.

1.5 Source Quality Control and Samples

- .1 Upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 5 weeks prior to commencing reinforcing work.
 - .2 Upon request only, and at least 4 weeks prior to commencing work, inform Consultant of proposed source of reinforcing steel, aggregates, and cement and all proposed admixtures, and provide access for sampling.
 - .3 Before ordering any concrete, the Contractor shall obtain from the ready-mix manufacturer and submit to the Consultant for approval, recent test reports from an approved testing laboratory on samples of materials and concrete taken from the ready-mix supplier, and a statement giving the proportions by dry weight of cement, and fine and course aggregates that will be used in the manufacture of each class of concrete to be ordered by the Contractor.
 - .4 In case of doubt as to the quality of the concrete provided by the proposed supplier, the Consultant may, at his option, order the Contractor not to use the concrete on the Work from such proposed supplier and the Contractor shall arrange for another acceptable source of supply.
 - .5 Equipment used for mixing or agitating concrete shall be clean and in good mechanical condition. Trucks may be subject to examination and individual approval by the Consultant to check for accumulation of hardened material, blade wear, water gauging, general condition and efficiency, etc.
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wear, water gauging, general condition and efficiency, etc.

- .6 The proportions of materials shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around the reinforcement. The mix proportions shall be such that the concrete will not easily segregate or cause excess free water to collect on the surface.
- .7 The slump test shall be used as a guide to workability, and to control the consistency of the concrete, especially from batch to batch. The value of slump for concrete shall be 80mm plus or minus 20mm unless otherwise approved by the Consultant.
- .8 No other admixtures will be permitted without the approval of the Consultant.
- .9 Integral Hardener shall be Hard-Cem by Cementec Industries Inc. at a rate of 40kg/m³ replacing an equal volume of fine aggregate.

1.6 Material Handling and Testing

- .1 Conform to Section 3300 Cast-in-Place Concrete for reference to general material handling, Cold Weather Requirements, and Field Quality Control.

PART 2 - PRODUCTS

2.1 Materials

- .1 Concrete used for all floor slabs on grade shall have a minimum compressive strength of 25 MPa (3625 psi) at 28 days.
 - .2 Minimum Portland cement content for concrete floor slabs on grade: 350 kg/cubic metre.
 - .3 Welded wire mesh where indicated on the drawings shall conform to CSA G30.5-M1983. Sizes shall be as noted on the drawings. Provide in flat sheets only.
 - .4 Chairs (for welded steel wire fabric support): shall be type B, No.87, 5/16" gauge galvanized wire 3 1/2" high as manufactured by Guy Guenette Ltd., St. Laurant, Quebec, (514)336-6344. Approved alternates will be accepted by Consultant.
 - .5 Pre-moulded joint filler: Expansion joint filler shall be flexible, lightweight, non-staining, polyethylene, and closed cell, DECK-O-FOAM by W.R. Meadows. It shall be a chemical-resistant, ultraviolet stable, non-absorbent, low density, compressible foam and have the following requirements:
 - .1 Density, ASTM D1751: 2.0 lbs/cu. ft (32.04 kg/cu.m)
 - .2 Compression strength, ASTM D3575.
 - .1 10% Deflection: 10 psi (69 KPa) maximum
 - .2 80% Deflection: 125 psi (862.49 KPa) maximum
 - .3 Tensile strength, ASTM D3575: 55 psi (379.50 KPa)
 - .4 Water Absorption, ASTM D3575: 0.5% vol. maximum
 - .5 Temperature Stability: -40°C to 71°C (-40°F to 160°F).
 - .6 Surface hardeners for plain floors (exposed in the finished structure):
 - .1 Integral concrete hardener to be hardened by Cementec Industries Inc.
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- .7 Precast floor topping left exposed in the building, not receiving coloured hardener, are to be sealed with two (2) coats of Vocomp 30 by W.R. Meadows, or Super Diamond Clear VOX by Euclid Canada. Install at a rate as specified by manufacturer.
- .8 Concrete floor curing and sealing compound: approved clear, acrylic polymer type, free flowing liquid which will adhere to damp concrete and meets the moisture retention requirements of ASTM C309, type 1, class B, and will not affect the bond of finished floor adhesives and/or joint sealants:
 - .1 Sealtight, Vocomp-30 by W.R. Meadows.
 - .2 Florseal WB 25 by Sika Canada.
 - .3 Super Diamond Clear VOX by Euclid Canada.
- .9 Sawcut filler: Qwik Joint UVR by Euclid Canada or Sika Loadflex Polyurea by Sika Canada.
- .10 Non-Slip Strips: Non-slip abrasive cement strip filler shall be two parts fine aluminum oxide to one part cement, in colour selected by the Consultant. Non-slip channel inserts shall be zinc, 10mm x 10mm x 20 gauge, dovetail shaped channels with anchors.
- .11 Vapour barrier: commercial quality polyethylene film, 6 mil thickness.
- .12 Rigid insulation: extruded, expanded conforming to CAN/CGSB 51.20 - M87, Type 4, 30 psi, DOW SM or equal.
- .13 Plastic Vapour Retarder: Vapour retarder membrane shall be manufactured from virgin polyolefin resins, and when tested according to all requirements of ASTM E1745, shall meet the following minimum performance requirements:
 - .1 Strength ASTM E1745 Class A
 - .2 Thickness 15 mils minimum
 - .3 Maximum water Vapour Permeance (ASTM E154 Section 7,8,11,12,13, by ASTM E96, Method B or ASTM F1249)Vapour barrier Products:
 - .4 Stego Wrap Vapour Barrier (15-mil) by Stego Industries LLC.
 - .5 Perminator 15 mil by W.R. Meadows.Accessories:
 - .6 Seams: Stego Tape by Stego Industries LLC, or High density polyethylene Tapewith presure sensitive adhesive. Minimum width 4" (100mm) as per manufactures specifications
 - .7 Sealing Penetrations: Stego Mastic or Stego Tape by Stego Industries LLC, or construct pip collars from vapour retarder materials and pressure sensitive tape per manufactures instructions.
 - .8 Perimeter / Edge Seal: Stego Crete Claw, or Stego Term Bar, or StegoTack Tape (double-sided sealant tape) by Stego Industries LLC; or Perminator Tape by W.R. Meadows as per manufacturer's instructions.

PART 3 - EXECUTION

3.1 Pre-Construction Conference

- .1 At least 15 days prior to start of concrete construction, the contractor shall hold a meeting to review the proposed concrete design mixes and to finalize methods and procedures for producing proper concrete construction. The contractor shall send a pre-concrete conference agenda to all attendees at least 7 days prior to the scheduled date of the conference.
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Five days prior to concreting operations another meeting, as described above, shall be convened by the Contractor.

- .2 The contractor shall require responsible representatives of every party who is connected with the concrete slab on grade to attend these conferences, including but not limited to the following:
- .3 Owner's representative, slab on grade consultant, project architect, structural engineer, geotechnical engineer, contractor's superintendent and all his foremen, testing agency responsible for the concrete design mix and field quality control, concrete sub-contractor, ready-mix concrete supplier, admixture, epoxy joint filler and shake-on hardener manufacturer(s), and concrete pumping contractor (if pumping in any location is contemplated).
- .4 Minutes of the meetings shall be recorded, typed, and printed by the Owner's representative or other designated party, and distributed by him to all parties concerned within 5 days after the meeting. The minutes shall include a statement by the concrete contractor, concrete supplier, and admixture manufacturer(s) indicating that the proposed mix design and placing techniques can produce the concrete quality required by these specifications.
- .5 All parties shall be notified at least 5 days prior to the scheduled date of each conference.

3.2 Placing Fabric Reinforcing

- .1 Place fabric reinforcing accurately and secure in position using steel chairs specified and annealed tie wires. Fabric to sit on chairs spaced in a 24" (600mm) grid each way. The fabric reinforcing shall be lapped 6" (150mm) minimum and tied securely to the chair.

3.3 Preparation and Placement

- .1 The floor slab shall be poured on a level, well compacted sub-base. The sub-base must not deviate by more than 3/8" (10mm) in either way from the specified profile.
- .2 Water-cement ratio may under no circumstances exceed 0.55. The concrete workability may be improved by the use of plasticizers.
- .3 Floor slabs shall be placed by a continuous pour the limits of each room. Placement of concrete shall be in accordance with good construction practices.

3.4 Floor Finish

- .1 The tops or other exposed unformed surfaces of concrete placed in all types of structures shall conform accurately to the grades and elevations shown on the Drawings.
 - .2 These surfaces are to be free from open texturing, plucked aggregates, local projections, and shall be such that when tested with a 10'-0" (3m) long straight edge (provided by the Contractor at his expense), placed anywhere in any direction on the surface, there shall be no gaps greater than 1/8" (3mm) between the bottom of the straight edge and the surface of the concrete. No variation will be permitted across any joint.
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- .3 Areas that do not meet the required surface accuracy shall be rectified as follows at the Contractor's expense:
 - .1 Grind down any areas higher than 1/8" (3mm) above the correct surface.
 - .2 Correct any areas lower than 1/8" (3mm) below the correct surface by grinding down the adjacent high areas.
 - .3 All grinding shall be carried out by an approved machine of a type and capacity suitable for the total area of grinding involved until the surface meets the specified requirements.
- .4 All unformed surfaces shall be finished by screeding followed by floating.
- .5 Screeding shall consist of moving a straight edge or template with a sawing motion along wood or metal strips established as guides. This shall be done immediately after consolidation of the concrete to give the surface its approximate shape and elevation.
- .6 After screeding, the surface shall be brought to the specified uniformity and accuracy with a wood float held in a floating position and worked in a circular or sawing motion slowly from one side of the surface to the other and back again.
- .7 All building floor surfaces, unless otherwise specified, after wood floating, shall be finished with a steel trowel or finishing machine. Trowelling shall be continued until the required finish is obtained during which time the temperature shall be maintained at a minimum of 10 degrees C. In order to prevent excess fines from working to the surface, steel trowel finishing shall be delayed until the concrete surface can no longer be dented with the finger. Dry cement or cement and sand shall not be used to blot up excess water.
- .8 Concrete floor slabs shall have surfaces sealed with one coat of specified sealer at a rate of 7.2 sq.m./litre (300 s.f./gal). Apply in accordance with manufacturer's written instructions.
- .9 Concrete floor slabs on grade which will be left exposed in the finished structure shall have Intergal Hardener added at the batching plant. Apply in strict accordance with the manufacturer's written instructions.
- .10 Cut shrinkage joints as quickly as possible after the concrete has hardened in such a way that the edges of the joints do not crumble. Saw cuts shall be 1/8" (3mm) wide with a depth of 1/3 of slab thickness. Saw cut joints shall be made so that the distance between joints does not exceed 20'-0" (6100mm). For joint layout, the location of columns, recesses, and changes of width of the floor must be taken into account. The contractor of this section shall submit joint location drawings to the Consultant for review at an agreed date prior to casting the floor.
- .11 Fill all sawcuts exposed in the finished building with sawcut filler specified. Saw cut filler shall be filled full depth, the use of backer rod or sand at the bottom of the joint is not permitted.

3.5 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
-

PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements__

1.2 Related Work

- .1 Section 03300 Cast-in-Place Concrete_
- .2 Section 05120 Structural Steel__
- .3 Section 05500 Metal Fabrications
- .4 Section 06100 Rough Carpentry
- .5 Section 06200 Finish Carpentry
- .6 Section 07840 Firestopping
- .7 Section 07920 Sealants
- .8 Section 08111 Steel Frames
- .9 Section 09250 Gypsum Board
- .10 Section 09900 Painting
- .11 Section 10800 Washroom Accessories

1.3 Reference Standard

- .1 Do masonry work in accordance with CAN3-A371-M84 except where specified otherwise. Do masonry mortar and grout work in accordance with CSA A179-M1976 except where specified otherwise. Do reinforcing and connecting of masonry in accordance with CAN3-A370-M84 and CAN3-A371-M84 unless specified otherwise.

1.4 Work Included

- .1 Items covered by this section include but are not limited to load bearing and non load bearing concrete block and brick masonry walls and partitions including the supply and erection of brick and concrete block masonry units, mortar materials, grout fill for hollow units and lintel blocks, reinforcing materials, and masonry anchors.
 - .2 Work under this Section also includes the supply and installation of finishing plaster (parging) where noted on the drawings.
 - .3 Build in all items supplied by others which are required to be built into masonry as the Work progresses, including but not limited to door frames, window frames, anchors, bolts, sleeves, electrical outlet boxes, inserts, loose lintels, shelf angles, loose door jambs and guards, panels and any other items required to be built into masonry work.
 - .4 Upon request,make available to the Consultant laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
 - .5 Install cavity wall insulation and air/vapour barrier as the work progresses.
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1.5 Samples

- .1 Submit samples of all masonry units to be used on this project to the Consultant for approval. Approved samples shall be retained at the Consultant's office and referred to as standard.

1.6 Product Delivery, Storage and Handling

- .1 Deliver materials to job site in dry condition. Keep materials dry until use. __
- .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids. Dumping of masonry units from trucks will not be permitted.

1.7 Protection

- .1 Keep masonry dry using waterproof, non- staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, 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.
- .3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

PART 2 - PRODUCTS

2.1 Mortar and Grout Materials and Proportions

- .1 Portland Cement: normal Portland cement to CAN/CSA-A5-M88 .
 - .2 Masonry Cement: to CSA/CSA-A8-M88 .
 - .3 Quicklime: to CSA-A82.42.
 - .4 Hydrated Lime: to CSA-A82.43-1950(R1971).
 - .5 Mortar Tite: Mortar admixture for water repellency by Addiment Inc.
 - .6 Mortar Accelerator: to be Mortar Kick by Addiment Inc. A non chloride mortar accelerator (when required).
 - .7 Sand: clean, course, and sharp, graded in accordance with CSA-A82.56-M1976.
 - .8 Water: clean and free from deleterious substances such as oils, acids, alkalis, and organic materials.
 - .9 Colour for mortar: "Extra Strong Mortar Colours" as manufactured by Northern Pigment Company Limited. Color to be selected by the Consultant.
 - .10 Mortar for manholes, catchbasins, sewers, and other exterior masonry at or below grade: Type M based on Proportion specifications.
 - .11 Mortar for above grade masonry: Type S and shall consist of:
 - .1 1 part Portland cement.
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- .2 1 part type H masonry cement.
- .3 Sand in proportion of not less than 2 1/4 and not more than 3 times the sum of the volumes of cements used.
- .4 All proportioning to be done by volume.

- .12 Mortar mixer: motorized.

- .13 While mixer is in operation, each batch shall be mixed as follows:
 - .1 Place approximately 75% of the water in the mixer.
 - .2 Add half the volume of sand.
 - .3 Add all the cement.
 - .4 Add the remainder of the sand.
 - .5 Add the remainder of the water as required (maximum amount of water that it is possible to use consistent with workability).
 - .6 Operate the mixer for 4 minutes, then dump.

- .14 Prepare and mix mortar materials under strict supervision, and in small batches only for immediate use. Do not use re-tempered mortars. Mortar Tite to be added to mortar for all masonry work in accordance with the manufacturer's instructions. Use mortar within 2 hours after initial mixing.

- .15 Avoid under and oversanding of the mix by checking mortar mix proportions daily during mortar mixing operations, using measuring boxes.

- .16 Coarse aggregate for grout fill: clean rounded gravel particles graded such that all particles are less than 5/8" (16mm) in size, 90% of particles are about 1/2" (13mm) in size, and not more than 10% of particles pass the 4.75mm sieve.

- .17 All grout for block filling shall consist of the following proportions by volume:
 - .1 1 part Portland Cement.
 - .2 2 1/4 to 3 parts masonry sand.
 - .3 1 to 2 parts coarse aggregate.

2.2 Materials

- .1 Standard concrete masonry units: to CAN3-A165 Series-M85(CAN3-A165.1).__
 - .1 Classification:
 - .1 Standard: H/15/A/0
 - .2 Size: 15 5/16" (390mm) x 7 1/2" (190mm) x width as indicated on the drawings
 - .3 Colour: Grey (Coloured where indicated on the drawings)
 - .4 Exterior walls full face split.

- .2 Control joint filler: Ceramar Joint Filler as manufactured by W.R. Meadows of Canada Ltd.

- .3 Masonry Reinforcement:(interior and exterior walls) truss design type as manufactured by Dur-O-Wal Inc. or Blok Lok Limited. Wire 9 gauge, deformed, Brite basic finish, sized 2" narrower than wall. Provide prefabricated corners and intersections where required (reinforcement to CAN3-A371-M84). Masonry reinforcing to be installed every second course.

- .4 Cavity wall insulation: refer to Section 07211 - Sprayed-On Insulation.

- .5 Through-wall flashing: Sealtight Flex-Guard PVC Masonry Flashing as manufactured by WR Meadows of Caada.

- .6 Weep holes and brick vents: Goodo PVC Brick Vents as distributed by Form and Build Supply Inc.

PART 3 - EXECUTION

3.1 General

- .1 Maintain dimensions, lines, and levels. __
- .2 Install masonry conforming to CAN3-S304-M84.
- .3 Install natural stone conforming to : BSI Adhered Natural Stone Veneer Installation Guide, Updated Edition June 2010.
- .4 Keep exposed faces free from stains, chips and cracks. The use of chipped, cracked, or deformed units in exposed work will not be acceptable. Any defective units installed will be removed at the Contractors expense.
- .5 The Contractor shall mix each mortar batch separately.
- .6 Buttering corners of units, throwing mortar scrapings into joints, slushing, or deep or excessive furrowing of bed joints will not be 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.
- .7 When mortar is "thumb-print" hard, tool joints slightly concave for exposed work; elsewhere, strike joints flush. Use sufficient force to press mortar tight against masonry units on both sides of masonry units.
- .8 Lay all joints 3/8" (10mm) thick unless otherwise specified or indicated on Drawings.

3.2 Laying Masonry

- .1 All masonry units are to be laid in full beds of mortar. Completely fill vertical joints between flanges of adjacent block. Space between facebrick and insulation must be free of mortar in cavity walls.
 - .2 Lay blocks with shells and webs aligning over each other. Horizontal and vertical masonry joints shall be uniform in thickness with vertical joints of alternate courses aligning.
 - .3 Lay work to minimize cutting.
 - .4 Use power-driven abrasive cutting disc or diamond cutting wheel for flush-mounted electrical outlets, grilles, pipes, conduit, etc., leaving 1/8" (3mm) maximum clearance.
 - .5 Provide masonry reinforcing in every second block course of all block walls. Provide prefabricated reinforcing tees in every second block course at intersecting block walls.
 - .6 Reinforce over all openings and in the first two courses under beam bearings and extending 3 feet (900mm) on each side of bearings unless otherwise noted on the structural drawings.
 - .7 Lay blockwork in running bond unless otherwise indicated on Drawings.
 - .8 Where bearing walls or exterior walls intersect with other bearing or exterior walls, they are to be tooth bonded.
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- .9 Where walls abut columns which are not exposed in masonry, rake out joint 1/2" (12mm) deep on both sides for full height of wall.
- .10 Where partitions abut other walls, they shall not be tooth bonded. Rake out joint 1/2" (12mm) deep on both sides for full height of wall.
- .11 Where block abuts concrete, bond block courses with dovetail anchors into dovetail slots in concrete. Dovetail anchors shall be 16" (400mm) o.c. vertically and 3 feet (900mm) o.c. horizontally staggered.
- .12 A non-load bearing partition shall not be chased out more than half its thickness and such chases shall be filled with mortar. No horizontal chases shall be allowed.
- .13 No chases shall be formed in any bearing wall that is less than 12" (300mm) thick or shall be more than 1/3 the thickness of any wall greater than 12" (300mm). In no case shall any two chases be closer than 7 feet (2100mm). No horizontal chases shall be allowed.
- .14 Carry all block partitions up through ceiling to structure above, unless noted otherwise, tight to bottom of structure.
- .15 Where masonry walls support beams, joists, lintels, or slabs, the top course of block under bearing shall be solid, or the cells shall be filled solid with 20 MPa concrete, unless noted otherwise on structural drawings.
- .16 Keep masonry units free from structural members to allow for movement. Use flexible metal ties for lateral support.
- .17 All walls shall be carried up in a uniform manner, no portion being raised more than 1 foot (300mm) above another at one time.

3.3 Control Joints

- .1 Install control joints where shown on the Drawings.__
- .2 Terminate masonry wall reinforcing and insulation at all joint locations.__
- .3 Fill joint in each wythe with joint filler specified.__
- .4 Apply Mel-Rol over joint (exterior face of inner wythe).__
- .5 Caulk exposed interior and exterior joints.__

3.4 Built-Ins

- .1 Build in items provided by other Sections, including steel door frames, anchor bolts, sleeves, inserts, loose lintels, steel beams, access panels and other such items. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes, and other items.
 - .2 Fill voids between masonry and metal frames with masonry mortar.
 - .3 Set wall plates on masonry in nonshrink grout in accordance with manufacturer's instructions.
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- .4 The masonry contractor shall supply dovetail anchor slots to be built in by Section 03300. This Section shall supply all necessary instructions and/or setting drawings indicating the location and tolerances to the Concrete Formwork Section.

3.5 Provision for Movement

- .1 Leave 1/8" (3mm) space below shelf angles.__
- .2 Leave 1/4" (6mm) space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.

3.6 Loose Steel Lintels

- .1 Install loose steel lintels. Centre over opening width.__

3.7 Protection of Masonry

- .1 The Contractor shall protect exposed masonry from damage, by methods which will not mar finished surfaces, corners and projections. Brace all walls against all horizontal loads such as wind or earth backfill and maintain all bracing in position until walls have reached adequate strength to resist horizontal loads or until they are laterally braced by other parts of the permanent structure. Completely cover open tops of walls at the end of each day, when not under actual construction and during rain and snow, with water-tight coverings. Cover all freshly built walls with tarpaulins during rain or snow and allow the coverings to overhang at least 2'-0" (600mm) on each side of the wall and anchor securely.
- .2 Make good any damage to this Work from any cause whatever until completion of this Work. Be responsible for any damage to the work of others caused by this Work.

3.8 Cold Weather Requirements

- .1 When outside temperature is below or likely to go below 4 degrees C, the temperature of materials and surrounding air and surfaces shall be heated with approved smokeless heaters to maintain a minimum temperature of 4 degrees C, during laying and at least 48 hours thereafter. Masonry units shall be completely free from ice and frost before laying.

3.9 Hot Weather Requirements

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

3.10 Testing

- .1 Inspection and testing will be carried out by an independent inspection and testing company designated by Consultant. Cost of such inspection and testing shall be paid for out of the Cash Allowance (see Section 01000 General Instructions). Note that re-testing of materials required due to failure to meet the requirements of this specification shall be paid for directly by the masonry sub-contractor and not out of the Cash Allowance.
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3.11 Cleaning

- .1 After completion of masonry walls, remove all mortar droppings. Allow mortar to thoroughly set and cure. Dry clean mortar off the wall using wood paddles and scrapers. In some cases, it may be necessary to use chisels. Saturate the masonry with clean water and flush off all mortar and dirt.
- .2 Scrub down walls with stiff fibre brushes using a solution of 100ml tri-sodium phosphate and 100ml household detergent dissolved in 4 litres of clean water. Thoroughly wash off all cleansing solution, dissolved efflorescence, dirt and mortar crumbs using clean pressurized water.
- .3 Other cleaning to remove such things as vanadium stain, manganese stain, and externally caused stains to be done in accordance with recommendations outlined in the National Concrete Masonry Association TEK Notes no. 45 1979 entitled Removal of Stains from Concrete Masonry Walls.
- .4 Repeat cleaning operation as often as required to produce clean masonry surfaces to the satisfaction of the Consultant.
- .5 Acid cleaning shall not be employed without express, written permission of the Consultant.

3.12 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
-

PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 03300 Cast-in-Place Concrete
- .2 Section 03371 Concrete Floor Slab on Grade
- .3 Section 04200 Unit Masonry
- .4 Section 05120 Structural Steel
- .5 Section 06100 Rough Carpentry
- .6 Section 09900 Painting

1.3 Reference Standards

- .1 ASTM A53/A53M-18, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A269/A269M-15A, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A307-14E1, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .4 CAN/CGSB-1.40-97, Anti-Corrosive Structural Steel Alkyd Primer.
- .5 CAN/CGSB-1.108-M89, Bituminous Solvent Type Paint.
- .6 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coating.
- .7 CAN/CSA-G40.20-G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
- .8 CSA-G164-18, CR 1998 Hot Dip Galvanizing of Irregularly Shaped Articles.
- .9 CAN/CSA-S16.1-94, Limit States Design of Steel Structures.
- .10 CSA W59-18 Welded Steel Construction (Metal Arc Welding).

1.4 Work Included

- .1 Miscellaneous items provided under this section include but are not limited to loose lintels and vanity support brackets.

1.5 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01000 General Requirements.
 - .2 Before any fabrication is begun, shop drawings of all miscellaneous metal items shall be submitted to the Consultant for review. Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and anchorage or connection with other work and all related hardware.
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work and all related hardware.

1.6 Delivery, Storage and Handling

- .1 Delivery materials to the job site in good condition and properly protected against damage to finished surfaces.
- .2 Storage on site: store materials in a location and in a manner to avoid damage. Stacking shall be done in a way which will prevent bending. Store metal components and materials in a clean, dry location. Cover with waterproof paper, tarpaulin or polyethylene sheeting in a manner that will permit circulation of air inside the cover.
- .3 Keep handling on-site to a minimum. Exercise care to avoid damage to finishes of material.

1.7 Project Conditions

- .1 Field measurements: check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Co-ordinate fabrication schedule with construction progress to avoid delay of work.
- .2 Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabrication of products without field measurements. Co-ordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2 - PRODUCTS

2.1 Materials

- .1 Steel sections and plates: to CSA G40.20/G40.21-98 AMENDMENT 2, Grade 300W or better.
 - .2 Hollow structural steel sections: to CAN G40.21-M87. Grade 350 or better.
 - .3 Welding: to CSA W59-18.
 - .4 Fasteners: as shown on Drawings, or if not shown on drawings, shall be of a suitable size, quality, strength, finish, and durability to provide adequate performance and/or appearance as required by their location in the Work.
 - .5 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CSA G164-18.
 - .6 Shop coat primer: CAN/CGSB-1.40-97.
 - .7 Zinc rich primer: ready mix to CGSB 1- GP-181M, containing not less than 95% zinc in the dry film.
 - .8 Grout: non-shrink, non-metallic, flowable, 15MPa at 24 hours, pull-out strength 7.9 MPa.
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2.2 Fabrication General

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Accessories and connections shall be adequate to safely withstand and sustain the stresses and strains to which they will be normally be subjected.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Castings shall be clean, smooth, true to pattern, of uniform thickness, with sharp edges, all free from defects.
- .5 Make welded joints where least conspicuous. Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 Shop Painting

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 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°C.
- .3 Clean surfaces to be field welded; do not paint surfaces to be field welded or cast in concrete.

PART 3 - EXECUTION

3.1 Examination

- .1 Installer shall examine the areas and conditions under which metal fabrication items are to be installed. Notify the Consultant in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer and the Consultant.

3.2 Preparation

- .1 Co-ordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to project site.
- .2 Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.3 Shop Painting

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
 - .2 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°C.
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- .3 Clean surfaces to be field welded; do not paint surfaces to be field welded or cast in concrete.

3.4 Field Painting

- .1 All items provided under this Section unless noted otherwise shall be painted.

3.5 General Installation

- .1 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections. Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .2 Make field connections with high tensile bolts to CAN3-S16.1-M84, or weld.
- .3 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .4 Touch-up rivets, field welds, bolts and burnt or scratched shop primed surfaces after completion of erection with same primer as was used in the shop. Touch-up galvanized surfaces with zinc rich paint where burned by field welding.
- .5 Do all installation work in a neat and workmanlike manner using methods and materials in conformity with current standard practice of the trade.
- .6 Do all fitting, cutting, drilling, welding, etc., required for installation of miscellaneous metal work.

3.6 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
-

PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 04200 Unit Masonry
- .2 Section 05120 Structural Steel
- .3 Section 06200 Finish Carpentry
- .4 Section 09110 Metal Stud Systems
- .5 Section 09250 Gypsum Board
- .6 Section 10050 Specialties
- .7 Section 10800 Washroom Accessories

1.3 Source Quality Control

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Pressure treated lumber: to CSA 080.M1

1.4 Work Included

- .1 The carpentry items to be provided under this section include but are not limited to: rough framing, roof trusses and rafters, blocking, plywood roof and wall sheathing, and electrical equipment backboards.

PART 2 - PRODUCTS

2.1 Lumber Material

- .1 Lumber: unless specified otherwise, framing lumber, nailers, blocking, etc. to be no. 2 grade Spruce Pine Fir, moisture content 19% or less in accordance with NLGA Standard Grading Rules for Canadian Lumber, 1987 edition.
 - .2 Roof sheathing shall be exterior grade spruce sheathing plywood conforming to CSA-0151 thickness as noted on drawing. Provide H-clips at all unsupported edges.
 - .3 Wall and deck sheathing: exterior grade spruce plywood, thickness as noted on the drawings.
 - .4 Wood trusses shall be standard prefabricated commercial wood trusses designed to carry the loads indicated on the drawings. Shop drawings certified by a registered professional engineer are required prior to erection of the roof trusses. Truss designer to provide all temporary and permanent bracing details.
-

- .5 All wood blocking, cants, sleepers, plywood etc., required for roofing and support of mechanical equipment on roof shall be pressure treated with wood preservative. All wood in contact with or built into concrete or masonry shall be pressure treated.

2.2 Fasteners

- .1 Provide and install all fastenings and hardware (except finishing hardware specified in Section 8710) as shown on the Drawings, specified herein, or required for proper installation of rough carpentry. Fastenings not shown or specified shall be of a suitable quality, size, strength, finish, and durability to provide adequate performance and/or appearance as required by their location in the Work.
- .2 Nails, spikes and staples: to CSA B111-1974 (R2003), galvanized for exterior locations and treated lumber, plain finish elsewhere.
- .3 Rough hardware (bolts, nuts, washers, lags, screws, etc.): hot dip galvanized to CSA G164-18.

2.3 Storage and Protection

- .1 Stack framing lumber to ensure proper ventilation and drainage. Protect lumber from the elements. Store lumber under cover in well ventilated building, and where not exposed to extreme changes of temperature or humidity.

PART 3 - EXECUTION

3.1 Construction

- .1 Comply with requirements of the current addition of the N.B.C., Part 9, supplemented by the following: all carpentry work shall be done by skilled mechanics in a workmanlike manner, accurately cut, fitted and secured as required or detailed. Bolt heads, screw heads, and anchor bolt nuts shall be recessed where required to allow correct application of the superimposed work.

3.2 Furring and Blocking

- .1 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, and other work as required. Align and plumb faces of furring and blocking to tolerance of 1:600. Refer to the drawings for locations. (Not all locations are shown).

3.3 Nailing Strips, Grounds and Rough Bucks

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

3.4 Curbs, Cants and Fascia Backing

- .1 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
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3.5 Sleepers

- .1 Install sleepers as indicated on the drawings.

3.6 Fasteners

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity. Countersink bolts where necessary to provide clearance for other work. Neatly mortise and fit all hardware as required. Mortise cuts shall be straight and sharp without ragged edges and sized accurately to accommodate hardware. Where mortising and application of hardware has not been done in a first class workmanlike manner, such work will not be acceptable, and work in which unworkmanlike mortising or fitting has been done shall be replaced.

3.7 Electrical Equipment Backboard

- .1 Provide backboards for mounting electrical equipment as indicated. Use 3/4" (19 mm) thick plywood on 1" x 2" (19 x 38 mm) wood furring around perimeter and at maximum 12" (300 mm) intermediate spacing.

3.8 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 04200 Unit Masonry
- .2 Section 06100 Rough Carpentry
- .3 Section 08111 Steel Frames
- .4 Section 08100 Steel Doors
- .5 Section 08120 Aluminum Doors and Frames
- .6 Section 08520 Aluminum Windows
- .7 Section 08700 Finish Hardware

1.3 Reference Standards

- .1 Do finish carpentry to Millwork Standards of the Architectural Woodwork Manufacturers Association of Canada (NAAWS 3.1 2018), except where specified otherwise.

1.4 Work Included

- .1 The work covered by this section includes, but is not necessarily limited to, the manufacture, delivery, assembly and installation of all cabinet and millwork units.
- .2 The work covered by this section also includes the fitting, trimming, and hanging of doors, and all screws, bolts, expansion shields or other devices not specifically shown or specified, but necessary for proper hardware application.
- .3 The work covered by this section also includes the installation of all finish hardware, supplied under Section 8710 Finish Hardware and door louvres supplied by Division 15 (if applicable).

1.5 Shop Drawings and Samples

- .1 Submit shop drawings and samples in accordance with Section 01000 General Requirements.
- .2 Submit for review layout and detail drawings and colour samples prior to installation.
- .3 Indicate details of construction, profiles, jointing, fastening and other related details. Indicate all materials, thicknesses, finishes and hardware.

1.6 Product Delivery, Storage and Handling

- .1 Protect materials against dampness during and after delivery.
 - .2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.
-

PART 2 - PRODUCTS

2.1 Materials

- .1 Plastic laminate: shall conform to CAN3-A172-M79 (R 1996), Type 1, general purpose, 1/16" nominal thickness. All panels shall be balanced with .020" backing sheet. Use urea resin adhesive conforming to CSA 0112.5-M1977. Plastic laminate shall have suede finish, colour by Consultant.
- .2 Edging: shall be plastic laminate, colour to match face panels, field applied to manufacturer's specifications.
- .3 Particle core board: unless noted otherwise, shall be 4.5 lb. industrial grade thickness as noted on the drawings. Apply plastic laminate to all exposed edges and surfaces.
- .4 Fitment framing: pine, to NLGA (Standard Grading Rules for Canadian Lumber, 1987) 115a, no. 1 common.
- .5 Counters, etc. shall be as detailed on the drawings using materials listed below:
 - .1 Counter top (fabrication): 3/4" (19mm) thick
 - .2 Counter tops (pre-formed): no drip edge and backsplash, plastic laminated covered. All exposed ends to be covered with plastic laminate.

PART 3 - EXECUTION

3.1 Workmanship

- .1 All work included in this section shall be secured to floors, walls, and/or appropriate back-up by experienced installation personnel to provide a neat, plumb, level, precise fitting, and smooth operating installation.
- .2 The installer shall provide all necessary fastenings and anchorage devices for securing all materials specified herein whether specifically shown on the Drawings or not, and shall provide the masonry sub-contractor with any anchorage or other devices which are required to be built into walls.

3.2 Hardware Installation

- .1 Before commencing installation work, examine carefully the work of other trades affecting the work of this section and report any deficiencies to the Consultant. Corrective measures shall be undertaken only as approved by the Consultant.
 - .2 Receive, store, and be responsible for all finish hardware. Properly tag, index, and file all keys. Fit and trim all doors as required. Apply all hardware in accordance with manufacturer's instructions; fit accurately, apply securely and adjust carefully. Use care not to injure other work when applying hardware.
 - .3 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Conversion Guide for Steel Doors and Frames prepared by Canadian Steel Door and Frame Manufacturers' Association.
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- .4 The hardware supplier shall check all hardware when it has been installed. The hardware supplier, or closer manufacturer on his behalf, shall check all door closers after they have been installed. In both cases, notify the Consultant of any cases where hardware or closers have not been properly installed, have not been properly adjusted (such as back-checking degrees, etc.), are defective, or are not as specified.
- .5 Replace defective hardware.
- .6 After completion of all work under this section, turn over all keys and special tools to designated members of Owner's staff and fully instruct them in the use of all special tools and in the adjustment and maintenance of all items of finishing hardware.

3.3 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus material, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 03300 Cast-in-Place Concrete
- .2 Section 05120 Structural Steel
- .3 Section 05310 Steel Roof Deck
- .4 Section 06100 Rough Carpentry
- .5 Section 07500 Mechanically Fastened T.P.O. Roof System
- .6 Section 07840 Firestopping
- .7 Section 09110 Metal Stud Systems

1.3 Work Included

- .1 The work covered by this Section includes the supply and application of perimeter rigid insulation, under slab insulation, batt insulation (thermal and sound) blown insulation, and vapour barrier as detailed on the Drawings.

1.4 Work Excluded

- .1 Frost protection of site services is covered in other Sections of this Specification.

1.5 Product Delivery, Storage and Handling

- .1 Deliver materials to site in their original wrapping with labels intact and store in ventilated areas, on site, protected from extreme changes of temperature or humidity.
- .2 Store insulation on raised platforms and protect with waterproof covers. Prevent exposure of insulation to sun.
- .3 Store materials inside building for 24 hours prior to usage.

PART 2 - PRODUCTS

2.1 Materials

- .1 General: use materials specified herein or approved equal; acceptance of approved equal to be in writing by the Consultant.
 - .2 Rigid insulation (perimeter): extruded, expanded polystyrene, conforming to CAN/CGSB 51.20-M87, type 4, minimum R value of 5.0 per inch, compressive strength of 30 psi, thickness as shown on Drawings.
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- .3 Blown-in insulation: shall be Propink Fiberglas Blown Insulation as manufactured by Owens Corning or equal. Thickness as required to achieve the R-Value specified on the drawings.
- .4 Vapour barrier (interior application) used with friction fit insulation shall be standard commercial quality polyethylene film at least 6 mils in thickness conforming with all test requirements of ASTM D697, D882 and D1004.
- .5 Air barrier tape: contractors sheathing tape evaluated by CCMC.
- .6 Rigid insulation adhesive: Henry / Bakor 230-21, or approved alternative.

PART 3 - EXECUTION

3.1 Preparation

- .1 Ensure that surfaces to receive adhesive or insulation are dry, firm, straight, and free from loose material, projections, ice, frost, slick, grease, oil or other matter detrimental to bond of the adhesive or uniform bedding of the insulation.
- .2 Maintain surface and ambient temperatures during application and curing of adhesive at a temperature recommended by the manufacturer of the type of adhesive used.

3.2 Installation

- .1 Install insulation when conditions meet requirements of sub-section 3.1 Preparation.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight to electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other projections and openings.
- .4 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation panels free from ripped backs or chipped or broken edges.
- .5 Install materials in accordance with manufacturer's instructions.

3.3 Foundation Perimeter Insulation

- .1 Install foundation perimeter insulation boards vertically on inside face of perimeter foundation walls extending to a minimum depth of 24" (600mm) below finished exterior grade.
- .2 Apply adhesive to insulation board by spot method with daubs 1" to 1 1/2" dia. at 8" o.c. each way.

3.4 Thermal Insulation (Batt)

- .1 Install thermal insulation where indicated on Drawings.
-

- .2 Fit batts between framing and press firmly into place. Butt tightly or overlap at joints, free of gaps.
- .3 Insulate between pipes, ducts, electric conduits and outlets or junction boxes. Cut insulation to fit around and behind obstructions and non-standard spaces.

3.5 Blown-In Insulation

- .1 Install gable vents between each roof truss at all roof gable locations.
- .2 Install insulation to thickness and R-Value noted herein or on the drawings. Thickness shall be uniform throughout the application area.

3.6 Air Barrier

- .1 Install in accordance with the manufacturer's instructions over exterior sheathing. Seal joints and penetrations through weather resistant barrier with specified tape and fasteners prior to installation of finish materials. Air barrier shall be free from holes, tears and punctures. All window and door penetrations are to be taped per manufacturer's instructions.

3.7 Vapour Barrier

- .1 Install vapour barrier where noted on the drawing and attached to sub-framing.
- .2 Seal around all penetrations and all laps with acoustical sealant.

3.8 Clean Up

- .1 On completion of the work of this Section, all protection erected under this Section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this Section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 04200 Unit Masonry
- .2 Section 05120 Structural Steel
- .3 Section 06100 Rough Carpentry
- .4 Section 07210 Building Insulation
- .5 Section 07920 Joint Sealants
- .6 Section 08111 Steel Frames
- .7 Section 08120 Aluminum Doors and Frames
- .8 Section 08520 Aluminum Windows

1.3 Quality Assurance

- .1 The work of this Section shall conform to CSA S136-12 and ASTM A653/A653M-17.
- .2 The design of the metal siding shall conform to CSA S136-12, North American specification for the design of cold-formed steel structural members.
- .3 The metal siding shall be designed to support a live load of 20 p.s.f.. Deflection shall not exceed 1/180th of the span.

1.4 Work Included

- .1 Work covered under this Section includes but is not necessarily limited to the complete supply and installation of prefinished metal cladding, closures, trim, flashings, caulking, furring channels, soffit and soffit support.

1.5 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01000 General Requirements.
- .2 Provide samples of profile and colour selection

1.6 Product Delivery, Storage and Handling

- .1 Metal siding shall not be delivered to the site until erection can begin immediately.
 - .2 All materials shall be stored in such a manner as to prevent damage.
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PART 2 - PRODUCTS

2.1 Materials

- .1 General: use materials specified herein or approved equal, approved in writing by the Consultant.
- .2 Siding: Shall be factory preformed, Universal Rib wall cladding, as manufactured by Ideal Roofing, painted steel 26 ga. Colour to be selected from standard colours.
 - .1 Trims and accessories to be the same material as the steel cladding.
- .3 Metal flashing and flat stock: prefinished, galvanized sheet steel, 26 ga. (0.56mm), to ASTM A653/A653M-17. Standard specification for sheet steel, zinc-coated (Galvanized) or zinc-iron Alloy-coated (Galv.) by the Hot-Dip process, coating designation G 90 commercial. Colour shall match wall.
- .4 Closures:
 - .1 Metal: fabricated from the same material, gauge and colour as metal siding or roofing, colour selection by Consultant.
 - .2 Foam: polyethylene foam closures. Provide at eaves, top and base of wall siding and around all openings.
- .5 Caulking: Supra Expert supplied by Ideal Roofing. Colour to match adjacent finishes.
- .6 Exterior fasteners: self-tapping nylon, hex-headed sheet metal screws. Nylon head shall be in a matching colour to blend with exterior steel and shall have a sealing washer flange as an integral part of the head to form a watertight seal.
- .7 Metal "Z" girts shall be 18 ga., galvanized, 1 1/4" leg. Projection shall be as noted on drawings.
- .8 Metal channels, 18 ga. hat section 3/4".

2.2 Fabrication

- .1 Workmanship shall be the best grade of modern shop and field practice. Joints and intersecting members shall be accurately fitted and made in true planes.
- .2 Make bend in true, straight and neat lines to leave sharp profiles.
- .3 Fit and assemble work in shop where possible. Execute work in strict accordance with details and approved shop drawings.

PART 3 - EXECUTION

3.1 Field Measurements

- .1 Visit the job site and take all measurements to ensure an accurate and proper fitting of the work of this Section into the building. Check all structural girts prior to the erection of siding, notifying the Consultant of any unfavourable conditions.
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3.2 Installation

- .1 All wall cladding and soffit shall be erected by manufacturer's own forces or his appointed agent.
- .2 The exterior sheet shall be fastened with self-tapping screws.
- .3 Metal flashings: install as necessary to complete the work related to the roof application. The fabrication and installation of flashings will be executed by skilled trade mechanics and in a manner to adequately provide for fastening and adequately provide for thermal movement.
 - .1 Double back exposed edges at least 1/2" (13mm) for appearance and stiffness.
 - .2 Provide starter strips where indicated or required to true, non-waving, leading edge. Anchor to back-up in approved manner to provide rigid, secure installation. Conceal fastening in completed flashing. Dovetail, mitre and seam all corners.
 - .3 Exposed fastenings shall be permitted only where concealed fastening is not possible.
- .4 Mitred corners shall be field fabricated and so designed to maintain a weathertight corner. Corners shall be caulked in a colour to match the exterior sheet.
- .5 Provide metal closures where siding abuts other materials. Provide foam end closures at all louvre, window and door openings and top of all sheets.
- .6 Secure work positively in an approved manner. Fastenings shall be of same material as cladding.
- .7 Touch-up damaged paint areas. Finished touch-up painting shall match prepainted material.

3.3 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 06100 Rough Carpentry
- .2 Section 07700 Roof Specialties and Accessories

1.3 Work Included

- .1 The work of this section includes but is not necessarily limited to the complete supply and installation of metal roofing, soffit and roll insulation, closures and trim and system support framing.

1.4 Quality Assurance

- .1 Installer: a firm with no less than three years experience in the installation of linear metal systems on projects of similar size and requirements.
- .2 Performance characteristics: provide manufacturer's standard system which, when installed, provides the following minimum requirements for structural performance:
 - .1 Wind load resistance: for exterior installations, provide components that are capable of withstanding wind loads of up to 30 psf without damage.

1.5 Shop Drawings and Submittals

- .1 Submit shop drawings in accordance with Section 1000 General Requirements.
- .2 Drawings shall include layout plan of system components, details of connections, carrier layout and connections to other building components.

1.6 Product Delivery, Storage and Handling

- .1 Delivery of materials: deliver components to project site in manufacturer's original unopened packages, clearly labelled with manufacturer's name and identification numbers.
- .2 Storage of materials: store components in fully enclosed space above the floor on skids to prevent warpage, scratches or damage from moisture, direct sunlight and other surface contamination.
- .3 Handling of materials: handling components in such a manner as to prevent racking, chipping of edges, distortion or other physical damage of any kind.

1.7 Job Conditions

- .1 Co-ordinate installation with mechanical and electrical work required to be incorporated into the linear metal system.
-

PART 2 - PRODUCTS

2.1 Materials

- .1 General: use materials specified herein or approved equal. Approvals in writing by the Consultant.
- .2 Sloped metal roofing: Shall be factory preformed, Commerical Rib panel roofing system as manufactured by Ideal Roofing, painted steel 26 ga. Colour to be selected from standard colours.
 - .1 Trims and accessories to be the same material as the steel cladding.
- .3 All metal roofing shall be underlaid with Grace Ice and Water Shield on plywood wood deck.
- .4 Metal flashing and flat stock: formed from the same material thickness as a metal roofing sheet.
- .5 Closures:
 - .1 Metal: fabricated from the same material, gauge and colour as metal siding or roofing. Colour selection by Consultant.
 - .2 Foam: polyethylene foam closures. Provide at eaves, top and base of wall siding and around all openings.
- .6 Caulking: Supra Expert supplied by Ideal Roofing. Colour to match adjacent finishes.
- .7 Exterior fasteners: self-tapping nylon, hex-headed sheet metal screws. Nylon head shall be in a matching colour to blend with exterior steel and shall have a sealing washer flange as an integral part of the head to form a watertight seal.
- .8 Eave Flashing: Eave starter by Ideal Roofing. #815 (Roof pitch as noted on drawings.) Colour to match roofing.
- .9 Roof Venting: Shall be continuous ridge vent #206 by Ideal Roofing. Colour to match roofing.
- .10 Snowguards: Shall be Ideal Guard, 2 hole bracket c/w rods, colour to match roofing, as manufactured by Ideal Roofing. Install blocking, sealant, and fasteners as per manufactures installation guide.

2.2 Fabrication

- .1 Workmanship shall be the best grade of modern shop and field practice. Joints and intersecting members shall be accurately fitted and made in true planes.
 - .2 Make bend in true, straight and neat lines to leave sharp profiles.
 - .3 Fit and assemble work in shop where possible. Execute work in strict accordance with details and approved shop drawings.
-

PART 3 - EXECUTION

3.1 Inspection

- .1 Installer to examine areas to receive roofing system for conditions that might adversely affect the installation of the system. Report all unsatisfactory conditions to the general contractor. Do not start installation work until all unsatisfactory conditions have been corrected. Take all measurements to ensure an accurate and proper fitting of the work of this Section into the building.

3.2 Preparation

- .1 Co-ordination: furnish layout for inserts, clips and other support items required to be installed by other trades prior to time of installation.
- .2 Measurements: field measure each area and establish layout to balance borders and minimize out-of-square conditions.

3.3 Installation

- .1 Install roll type ice and water shield on top of plywood roof deck.
 - .2 Install metal roofing, soffit, metal flashing and all roofing accessories in accordance with the manufacturer's written installation instructions.
 - .3 All roofing shall be erected by manufacturer's own forces or his appointed agent.
 - .4 Install roofing snow-guards where shown on the drawings. One unit to be installed between each roof rib. Unit to be fastened to the roof deck with sealant adhesive in accordance with the manufacturer's written instructions.
 - .5 The exterior sheet shall be fastened with self-tapping screws.
 - .6 Metal flashings: install as necessary to complete the work related to the roof application. The fabrication and installation of flashings will be executed by skilled trade mechanics and in a manner to adequately provide for fastening and adequately provide for thermal movement.
 - .1 Double back exposed edges at least 1/2" (13mm) for appearance and stiffness.
 - .2 Provide starter strips where indicated or required to true, non-waving, leading edge. Anchor to back-up in approved manner to provide rigid, secure installation. Conceal fastening in completed flashing. Dovetail, mitre and seam all corners.
 - .3 Exposed fastenings shall be permitted only where concealed fastening is not possible.
 - .7 Mitred corners shall be field fabricated and so designed to maintain a weathertight corner. Corners shall be caulked in a color to match the exterior sheet.
 - .8 Provide metal closures where siding abuts other materials. Provide foam end closures at all louvre, window and door openings.
 - .9 Secure work positively in an approved manner. Fastenings shall be of same material as cladding.
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- .10 Touch-up damaged paint areas. Finished touch-up painting shall match pre-painted material.
- .11 Seal side lips of roof cladding with an approved sealant.

3.4 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 04200 Unit Masonry
- .2 Section 06100 Rough Carpentry
- .3 Section 07610 Pre-Finished Metal Roofing
- .4 Section 07920 Joint Sealants

1.3 Work Included

- .1 The work of this section includes but is not necessarily limited to the complete supply and installation of soffit and fascia, eavestrough and downspouts.

1.4 Work Excluded

- .1 Roof walkways, metal flashings for membrane roofs and pre-finished metal roofing are covered elsewhere in these specifications.

1.5 Quality Assurance

- .1 Installer: a firm with no less than three years experience in the installation of linear metal systems on projects of similar size and requirements.
- .2 Performance characteristics: provide manufacturer's standard system which, when installed, provides the following minimum requirements for structural performance:
 - .1 Wind load resistance: for exterior installations, provide components that are capable of withstanding wind loads of up to 30 psf without damage.

1.6 Shop Drawings and Submittals

- .1 Submit shop drawings in accordance with Section 1000 General Requirements.
- .2 Drawings shall include layout plan of system components, details of connections, carrier layout and connections to other building components.

1.7 Product Delivery, Storage and Handling

- .1 Delivery of materials: deliver components to project site in manufacturer's original unopened packages, clearly labelled with manufacturer's name and identification numbers.
- .2 Storage of materials: store components in fully enclosed space above the floor on skids to prevent warpage, scratches or damage from moisture, direct sunlight and other surface contamination.
- .3 Handling of materials: handling components in such a manner as to prevent racking, chipping of edges, distortion or other physical damage of any kind.

1.8 Job Conditions

- .1 Co-ordinate installation with mechanical and electrical work required to be
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- .1 Co-ordinate installation with mechanical and electrical work required to be incorporated into the linear metal system.

PART 2 - PRODUCTS

2.1 Materials

- .1 General: use materials specified herein or approved equal. Approvals in writing by the Consultant.
- .2 Rain carrying system: shall be heavy gauge aluminum with baked on enamel finish. Colour by Consultant. Eavestrough shall be seamless 5" gutter. Downspouts shall be 4" x 3". Provide all required fittings and fasteners.
- .3 Fascia: shall be heavy gauge aluminum with baked on enamel finish. Color by the Consultant.
- .4 Metal Soffit: shall be factory preformed, Canadiana panel as manufactured by Ideal Roofing, painted steel 26 ga. Colour to be selected from standard colours.
- .5 Vinyl Soffit: Shall be residential vinyl. Soffit to be vented.
- .6 Metal flashing and flat stock: prefinished, galvanized sheet steel, 26 ga. (0.56mm), to ASTM A653/A653M, coating designation G90 commercial, Stelcolor 5000 Series. Color selection by Consultant.

2.2 Fabrication

- .1 Workmanship shall be the best grade of modern shop and field practice. Joints and intersecting members shall be accurately fitted and made in true planes.
- .2 Make bend in true, straight and neat lines to leave sharp profiles.
- .3 Fit and assemble work in shop where possible. Execute work in strict accordance with details and approved shop drawings.

PART 3 - EXECUTION

3.1 Inspection

- .1 Installer to examine areas to receive soffit and roofing system for conditions that might adversely affect the installation of the system. Report all unsatisfactory conditions to the general contractor. Do not start installation work until all unsatisfactory conditions have been corrected. Take all measurements to ensure an accurate and proper fitting of the work of this Section into the building.

3.2 Preparation

- .1 Co-ordination: furnish layout for inserts, clips and other support items required to be installed by other trades prior to time of installation.
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- .2 Measurements: field measure each area and establish layout to balance borders and minimize out-of-square conditions.

3.3 Installation

- .1 Install metal fascia, soffit, metal flashing and all roofing accessories in accordance with the manufacturer's written installation instructions.
- .2 Exposed fasteners shall be permitted only where concealed fastening is not possible.
- .3 Secure work positively in an approved manner. Fastenings shall be of same material as cladding.
- .4 Touch-up damaged paint areas. Finished touch-up painting shall match pre-painted material.

3.4 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 03300 Cast-in-Place Concrete
- .2 Section 04200 Unit Masonry
- .3 Section 06200 Finish Carpentry
- .4 Section 08111 Steel Frames
- .5 Section 10050 Specialties
- .6 Division 15 Mechanical
- .7 Division 16 Electrical

1.3 Work Included

- .1 Exterior schedule:
 - .1 Perimeters of exterior openings where frames meet exterior of building, including all items noted in sub-section 1.2 Related Work.
 - .2 Expansion and control joints in exterior surfaces of poured concrete walls.
 - .3 All other locations shown on the Drawings.
- .2 Interior schedule:
 - .1 Seal interior perimeters of exterior openings.
 - .2 Control and expansion joints on the interior of exterior poured concrete walls.
 - .3 Control and expansion joints in the interior of exterior masonry walls.
 - .4 Perimeters of all interior frames.
 - .5 Interior masonry vertical control joints and expansion joints (block to block, block to concrete, block to steel).
 - .6 Perimeters of washroom fixtures (sinks, urinals, WC's, basins).
 - .7 Exposed interior joints between differing materials. i.e. joint between wall or lintel and H.M. window frame; joint between H.M. window frame and sill; joint between underside of sill and masonry block, and top of tile/schluter at wall base, etc...
 - .8 Top and bottom of all sound rated wall assemblies where noted on the drawings.
 - .9 All other locations shown on the Drawings.

1.4 Work Excluded

- .1 All firestopping caulking shall be as specified elsewhere in these Specifications.

1.5 Quality Assurance

- .1 Contractor should be able to demonstrate to the satisfaction of the Consultant proof of competence in application of specified material and have knowledge of the design and system. Work shall be executed by fully trained mechanics in
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the design and system. Work shall be executed by fully trained mechanics in strict accordance with manufacturer's printed directions.

1.6 Warranty

- .1 The work under this Section shall be guaranteed against defects in accordance with Section 00700 - General Conditions, but for a period of 3 years.
- .2 The written warranty shall state that caulking work of this Section is guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion or staining adjacent surfaces.
- .3 Warranties shall be submitted as outlined above and in accordance with Section 00800 Amendments to and Supplementary General Conditions.

PART 2 - PRODUCTS

2.1 Materials

- .1 All caulking materials specified below are as manufactured by Tremco Ltd. Colours to be selected by the Consultant from the manufacturer's standard colour range.
 - .2 Exterior caulking: shall be fast-curing, multi-component polyurethane sealant "Dymeric 240FC", or approved equal, meeting the requirements of CAN/CGSB 19.24-M90.
 - .3 Interior caulking: (with the exception of expansion joints and perimeters of washroom fixtures) shall be non-staining one part Siliconized Acrylic Latex Sealant "Tremflex 834", or approved equal, meeting the requirements of CGSB 19-GPM-17M and ASTM C-834.
 - .4 Interior expansion or control joints: High Performance, High Movement Single-Component, Polyurethane Sealant, "Dymonic 100" or approved equal.
 - .5 Caulking for perimeter of washroom fixtures: Single-Component, Acetoxy Silicone Sealant "Tremsil 200" containing fungicide suitable for use in kitchens, bathrooms, spas and similiar applications where joints need protection against fungi and bacteria; or approved equal.
 - .6 Acoustical sealant: One-Part, Non-Skinning, Sound Damping Sealant "Acoustical Curtainwall Sealant" conforming to ASTM D-217-94 , or approved equal.
 - .7 Gutter Seals: Gutter Sealing Elastomeric Sealant "Gutter Seal" designed for use in gutter and rainwater applications, suitable for metal-to-metal and metal-to-plastic.
 - .8 Primers: suitable for substratum surfaces, as recommended by the sealant manufacturer.
 - .9 Joint backing: preformed, compressible, resilient, non-water absorbing, non-staining foam as recommended by the sealant manufacturer. Backing shall be of sizes and shapes to suit the various conditions, and shall be compatible with the sealant, primer, and substrata.
 - .10 Bond breaker: as recommended by the sealant manufacturer.
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- .11 Cleaning agent: as recommended by the sealant manufacturer.

PART 3 - EXECUTION

3.1 Protection

- .1 Protect installed work from contamination or staining from other trades.

3.2 Preparation

- .1 Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.
- .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 Prepare concrete, masonry, glazed and vitreous surface to sealant manufacturer's instructions.
- .5 Good joint design requires that joints should be designed for not less than 4 times the anticipated joint movement, and in all cases the following minimum and maximum joint sizes should be followed:
- .1 minimum joint size 1/4" x 1/4" (6.3mmx6.3mm)
 - .2 for joints wider than 1/4" (6.3mm) but less than 1/2" (12.5mm), the depth of sealant should be no more than 3/8" (9.5mm)
 - .3 for joints 1/2" (12.5mm) to 2" (50mm) wide the depth should not exceed 1/2" (12.5mm)
- .6 Install joint filler to achieve correct joint depth.
- .7 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .8 Apply bond breaker tape where required to manufacturer's instructions.
- .9 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.3 Application

- .1 Apply sealants to manufacturer's instructions. 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 to ensure full wet out of the bond line into the substrate.
- .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.
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3.4 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.

PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.____

1.2 Related Work

- .1 Section 06200 Finish Carpentry
- .2 Section 08111 Steel Frames
- .3 Section 08700 Finish Hardware
- .4 Section 08710 Automatic Door Operators
- .5 Section 08800 Glazing
- .6 Section 09900 Painting
- .7 Division 15 Mechanical

1.3 Requirements of Regulatory Agencies

- .1 Hollow steel fire rated doors: listed and labelled by an organization accredited by Standards Council of Canada in conformance with CAN/ULC-S104-15 Standard Method for Fire Tests of Door Assemblies and CAN/ULC-S105:2016 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
- .2 Install labelled hollow steel fire rated doors to NFPA80 2019 Edition except where specified otherwise.

1.4 Work Included

- .1 The items covered by this section include but are not limited to the manufacture, delivery, and protection of all hollow steel doors shown or scheduled on the contract drawings or in the specification.
- .2 Doors should be prepared and reinforced to accept the installation of door grilles and louvres covered under Division 15.

1.5 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01000 General Requirements.____
 - .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazing, louvres, arrangement of hardware and fire rating.
 - .3 Include schedule identifying each unit with door marks and numbers relating to numbering on drawings and in the door schedule.
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PART 2 - PRODUCTS

2.1 Materials

- .1 Hollow steel doors shall be as follows:
 - .1 Interior: 18 ga., minimum zinc coating of 0.25 oz/ft², ZF75, galvanneal.
 - .2 Exterior: 16 ga., minimum zinc coating of 0.90 oz/ft², ZF75, G90.

2.2 Fabrication

- .1 Exterior doors: shall have door skins bonded to a polyurethan core with seams tack welded, ground smooth, filled and primed. Provide exterior doors with top weathering cap.
- .2 Interior doors: constructed of steel sheets bonded in a resin-impregnated kraft honeycomb core completely filling inside of door. Seams shall be lace welded dress ground smooth and primed.
- .3 Form hollow steel stile and rail doors from tubular steel with reinforced mitred corners and all seams continuously face welded and ground smooth.
- .4 All doors shall have a 1/8":2" (3mm:50mm) bevel on door edges, shall be furnished with reinforcing plates for surface-mounted closers, and shall be mortised, reinforced, drilled and tapped for hinges and lock.
- .5 All doors shall have a net width 3/16" (4.76mm) narrower than nominal door width (frame width), and shall have net height 1/8" (3mm) less at the top and 3/4" (19mm) less at the bottom than nominal door height (frame height). Locate prepared hinge locations so that a 3/4" (19mm) space is provided between the door bottom and finished floor (bottom of frame).
- .6 Fit all exterior doors with a top weather cap.
- .7 Openings for louvres if specified shall be reinforced.
- .8 Openings for glazing if specified shall be reinforced and furnished with extruded aluminum glass trim with snap-on glazing beads.

PART 3 - EXECUTION

3.1 General

- .1 Before commencing any work, examine existing work and the work of other trades, and determine accurately in the field all conditions affecting the work of this section, including dimensions. Immediately notify the Consultant of any failure of the building components to fit together properly. Corrective measures shall be undertaken only as approved by the Consultant.

3.2 Protection

- .1 All hollow steel doors shall be individually wrapped with protective wrappings by the manufacturer, and shall not be delivered to the work site until all concrete, masonry, plastering, and roofing work is completed.
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3.3 Installation

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08700 Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds.
- .3 Adjust operable parts for correct function.
- .4 Install louvres in accordance with manufacturer's templates and instructions. Louvres to be supplied under other divisions of these specifications.

3.4 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 03300 Cast-in-Place Concrete
- .2 Section 04200 Unit Masonry
- .3 Section 06200 Finish Carpentry
- .4 Section 07920 Joint Sealants
- .5 Section 08110 Steel Doors
- .6 Section 08700 Finish Hardware
- .7 Section 08800 Glazing
- .8 Section 09110 Metal Stud Systems
- .9 Section 09900 Painting

1.3 Work Included

- .1 The items covered by this section include but are not limited to the manufacture, delivery, installation and touch-up of all hollow steel door frames, screens and windows shown or scheduled on the Drawings or in the Specification.

1.4 Work Excluded

- .1 The supply and installation of glazing is covered in Section 08800.

1.5 Requirements of Regulatory Agencies

- .1 Steel fire rated frames: listed and labelled by an organization accredited by Standards Council of Canada in conformance with CAN/ULC-S104-15 Standard Method for Fire Tests of Door Assemblies and NFPA252 2017 Edition Standard Methods of Fire Tests of Door Assemblies for ratings specified or indicated.
- .2 Provide fire labelled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN/ULC S104-15, ASTM E2074-00e1 or NFPA252 2017 Edition and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .3 A physical label or approved marking shall be affixed to the fire rated frame at an approved facility as evidence of compliance with the procedures of the labelling agency.

1.6 Design Requirements

- .1 Design frames to limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM #330 under wind load of 1.2 kPa.

1.7 Delivery Storage and Handling

- .1 Delivery, handel and store frames at the job site in such a manner as to prevent damage.

1.8 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01000 General Requirements.
-

- .2 Indicate each type frame, material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and finishes.
- .3 Include schedule identifying each unit, with door and window marks and numbers relating to numbering on Drawings and Door Schedule.

PART 2 - PRODUCTS

2.1 Materials

- .1 Steel for frames shall be commercial quality cold-rolled steel to ASTM A568-81, hot dipped galvanized to ASTM A653/A653M-18 with coating designation as follows:
 - .1 Interior: A25 (ZF75), 0.25 oz./ft² (76g/m²) minimum, galvanneal wipecoat.
 - .2 Exterior: G90 (Z275), 0.90 oz./ft² (275 g/m²) minimum.
- .2 Door silencers: single stud rubber/neoprene type.
- .3 Thermal breaks: rigid polyvinylchloride extrusion.
- .4 Glazing stops: fabricate glazing stops as formed channel, minimum 5/8" (16mm) height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

2.2 Fabrication

- .1 Exterior frames shall be 16 gauge, welded type construction. Provide thermally broken frames where noted or shown on the drawings. Interior frames shall be 18 gauge knock-down type construction for all openings within each suite unit. All other frames shall be welded.
- .2 Frames shall consist of butt, jamb, stop and casing in one integral unit with profile suitable for door sizes and thicknesses called for on the drawings.
- .3 Head of door frames shall be 2 5/8" (66mm) high for installation in masonry walls and 2" (50mm) for installation in drywall partitions unless noted otherwise on the drawings.
- .4 Frames shall be blanked, reinforced, drilled and tapped for mortised, templated hardware. Frames shall be reinforced, for surface mounted hardware. Drilling and tapping for surface mounted hardware is by others, on site, at time of installation. Provide for appropriate anchorage to floor and wall construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 60" (1524mm) provide two (2) anchors, and an additional anchor for each additional 30" (762mm) of height of fraction htereof.
- .5 Jamb depths for door and screens used in drywall partitions shall be of suitable depth to fit snugly over the finished wall thickness.
- .6 Jamb depths for door and window frames used in masonry walls shall be as follows:

- .1 4 3/4" (121mm) deep in 4" (90mm) masonry walls.
 - .2 5 3/4" (146mm) deep in 6" (140mm) masonry walls.
 - .3 6 3/4" (172mm) deep in 8" (190mm) masonry walls.
 - .4 8 3/4" (222mm) deep in 10" (240mm) and 12" (290mm) masonry and steel framed walls.
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- .7 All frames scheduled to be fire-rated shall be manufactured in accordance with specifications issued by an organization accredited by Standards Council of Canada and shall have the appropriate labels permanently affixed to the frames.
 - .8 Manufacture hollow steel frames for windows, screens, transoms and sidelights similar to door frames but with removable glazing stops held in place with counter-sunk flat head machine screws.
 - .9 Fabricate window frame width and height to sizes called for on the Drawings and Schedules.

PART 3 - EXECUTION

3.1 General

- .1 Before commencing any work, examine existing work and the work of other trades, and determine accurately in the field all conditions affecting the work of this section, including dimensions. Immediately notify the Consultant of any failure of the building components to fit together properly. Corrective measures shall be undertaken only as approved by the Consultant.

3.2 Installation

- .1 Set hollow steel door frames in place square and plumb and securely braced until they are completely built-in to walls and partitions.
- .2 Refer to the drawings for installation details.
- .3 Anchor door frames securely to the supporting floor and wall with adjustable base anchors at the bottom of each jamb, and not less than three wall anchors equally spaced along each jamb.
- .4 It shall be the responsibility of this Sub-contractor to provide the masonry sub-contractor with sufficient anchorage devices and installation instructions for the building-in and anchorage of door frames in masonry walls and partitions.

3.3 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 06200 Finish Carpentry
- .2 Section 08110 Steel Doors
- .3 Section 08111 Steel Frames
- .4 Section 08120 Aluminum Doors and Frames
- .5 Section 08710 Automatic Door Operators
- .6 Division 16 Electrical

1.3 Work Included

- .1 The work covered by this section includes the manufacture, packaging, and delivery of all finish hardware shown or scheduled on the Drawings, Schedules and/or in the Specifications.
- .2 Include all screws, bolts, expansion shields or other devices not specifically shown or specified, but necessary for proper finish hardware installations.

1.4 Work Excluded

- .1 The supply and installation of all hardware for cabinets and millwork is covered in Section 06200, Finish Carpentry.
- .2 The installation of all finish hardware supplied under this Section is included in Section 06200, Finish Carpentry.
- .3 Barrier free operators are supplied and installed with the hardware allowance.

1.5 Requirements Regulatory Agencies

- .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.6 Closeout Submittals

- .1 Provide approved Hardware List for incorporation into Maintenance and Project Record Manual specified in Section 01000, General Requirements.
- .2 Provide operation and maintenance data for door closers, locksets, door holders and fire exit hardware for incorporatin into Maintenance and Project Record Manual specified in Section 01000, General Requirements.

1.7 Maintenance Materials

- .1 Supply two sets of wrenches for door closers, locksets and fire exit hardware.

1.8 Quality Assurance

- .1 Only recognized contract hardware distributors will be considered for the work of
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- .1 Only recognized contract hardware distributors will be considered for the work of this Section. The distributor shall have on staff a qualified Architectural Hardware Consultant recognized by the Door and Hardware Institute or a person with equivalent qualifications to assist installers and direct detailing, processing and delivery of material, and certify installation acceptance.

1.9 Delivery and Storage

- .1 Store finishing hardware in locked, clean and dry area.
- .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

1.10 Cash Allowance

- .1 The Owner will make arrangements for the supply and installation of the finishing hardware for this project.
- .2 The Contractor shall include in the contract price the cost of all labour, materials, overhead and profit applicable to the installation of all finishing hardware reasonably anticipated within the cash allowance.
- .3 All unspent portions of the allowance shall be credited to the Owner.

PART 2 - PRODUCTS

2.1 Materials

- .1 An approved Hardware List will be prepared and separately bid under the direction of the Consultant after award of the contract. The General Contractor shall assume full responsibility for the sub-contract when awarded.

PART 3 - EXECUTION

3.1 Installation

- .1 Before commencing installation work, examine carefully the work of other trades affecting the work of this Section and report any deficiencies to the Consultant. Corrective measures shall be undertaken only as approved by the Consultant.
 - .2 Receive, store, and be responsible for all finish hardware. Properly tag, index, and file all keys.
 - .3 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
 - .4 Furnish manufacturers' instructions for proper installation of each hardware component.
 - .5 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.
 - .6 Wiring Diagrams:
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- .1 Provide any special information, voltage requirements and wiring diagrams to other trades required such information.

3.2 Adjusting and Cleaning

- .1 At final completion, hardware shall be left clean and free from disfigurement. Make a final adjustment to all door closers and other necessary items. Where hardware is found defective, repair or replace or correct as directed by inspection reports. Cleaning of hardware shall not be made with any abrasive materials or paint remover type chemicals. Hardware items use lacquer coatings which can be damaged if not properly cleaned.

3.3 Protection

- .1 All hardware shall be protected against damage from paint, plaser or other defacing materials. Whenever possible manufacturers protective covering when provided, shall not be removed until final project cleaning takes place. Material not protected by manufacturer shall be covered or removed from door during painting or any other adjustments that can cause damage to hardware.

3.4 Commissioning

- .1 After completion of all work under this section, turn over all keys and special tools to designated members of Owner's staff and fully instruct them in the use of all special tools and in the adjustment and maintenance of all items of finishing hardware.

3.5 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements

1.2 Related Work

- .1 Read carefully all other Sections of this Specification to determine the extent of the prime and finish coats applied by others.
- .2 Section 4200 Unit Masonry
- .3 Section 5120 Structural Steel
- .4 Section 5500 Metal Fabrications
- .5 Section 6200 Finish Carpentry
- .6 Section 8110 Hollow Steel Frames
- .7 Section 8115 Hollow Steel Doors
- .8 Section 9250 Gypsum Board
- .9 See Division 15 Mechanical and 16 Electrical for instructions on painting work of those Divisions.

1.3 Work Included

- .1 The work covered by this Section includes the field painting of:___
 - .1 The interior and exterior of the building as listed on the Room Finish Schedule and elevations.
 - .2 All exposed wood and metal on all doors, door and window frames, mechanical and electrical equipment, frames and supports, and trim in both painted and unpainted parts of the building as specified or listed on the Room Finish Schedule or on the Drawings.
 - .3 Exposed piping and ductwork (except for identification banding) to be painted to match adjacent walls and/or ceilings (where adjacent walls and/or ceilings are to be painted under this Section).
 - .4 The exterior of the building additions above the top of the foundation walls, except for factory finished items.

1.4 Work Excluded

- .1 Prime coats specified herein will not be required on items delivered with prime__ or shop coats already applied (see other sections of the Specification).
- .2 Field painting will not be required on items specified to be completely finished at factory or on aluminum, copper, brass, bronze and other non-ferrous metal unless specifically designated.

1.5 List of Materials

- .1 A list of materials proposed for use on the work, prepared by the paint manufacturer, shall be submitted in writing to the Consultant for approval at
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manufacturer, shall be submitted in writing to the Consultant for approval at least sixty days before the materials are required on site.

1.6 Submittals

- .1 Submit submittal packages in accordance with Standard Specification Section 130.
- .2 Submit coating manufacturer's data sheets for the products to be applied. Data sheets shall show the following information:
 - .1 Percent solids by volume.
 - .2 Minimum and maximum recommended dry film thickness per coat for prime, immediate and finish coats.
 - .3 Recommended surface preparation.
 - .4 Recommended thinners.
 - .5 Statement verifying that the specified prime coat is recommended by the manufacturer for use with the specified intermediate and finish coats.
 - .6 Application instructions including recommended equipment and temperature limitations.
 - .7 Curing requirements and instructions.
- .3 Submit colour swatches.
- .4 Submit certificate identifying the type and gradation of abrasives used for surface preparation.
- .5 Submit material safety data sheets for each coating.

1.7 Product Delivery, Storage and Handling

- .1 Deliver materials to site in their original containers with labels intact and store in ventilated areas, on site; protect from extreme changes of temperature or humidity. Keep stored materials covered at all times and take all necessary precautions against fire.
- .2 Provide CO2 fire extinguisher of minimum 20 lbs. capacity in storage area.

1.8 Maintenance Materials

- .1 The painting contractor shall include in his cost, to supply to the Owner, after completion of his contract, 4 litres (unopened) of each paint colour of hue specified in the Colour Schedule. The paint shall be supplied in properly marked containers, keyed to the approved Colour Schedule. For costing purposes, the painting contractor shall include a maximum requirement of five (5) - 4 litre containers.
- .2 The painting contractor shall, when complete, provide a colour schedule 'As Built', if colours used were different from those specified on the Consultant's Colour Schedule. Manufacturer, colour code number and colour name are to be listed.

1.9 Environmental Requirements

- .1 Do not paint or finish in unclean or improperly ventilated areas.____
- .2 Do not paint in temperatures lower than 10 degrees C or varnish in temperatures lower than 19 degrees C .

1.10 Protection

- .1 Provide metal pans or adequate non-staining tarpaulin to protect floors in areas assigned for the storage and mixing of paints.
- .2 Use sufficient drop cloths and protective coverings for the full protection of floors, furnishings, and work not being painted. Protect mechanical, electrical, and special equipment, hardware, and all other components of the building which do not require painting, from paint spotting and other soiling during the painting process.
- .3 Leave above areas clean and free from evidence of occupancy upon completion of painting.
- .4 Protect paint materials from fire and freezing.
- .5 Keep waste rags in metal drums containing water and remove from building at end of each working shift.

PART 2 - PRODUCTS

2.1 Materials

- .1 "Top Line" products only are acceptable. Use only products of manufacturers whose best quality lines meet or exceed CGSB specifications listed in the Paint Material Standard attached hereto, except for specially mentioned materials or manufacturers.
- .2 Painting Coatings System Index
Exposed Metal Coating Systems
 - .1 Exposed Metal, Corrosive Environment - High Build Epoxy (2 coat system) with polyurethane topcoat
 - .2 Exposed Metal, Exterior - Epoxy with urethane topcoatPVC, CPVC and FRP Coating System
 - .3 PVC, CPVC and FRP, Ultraviolet Exposure - polyurethaneMetal in Contact with Concrete Coating System
 - .4 Aluminum and concrete - epoxyPlaster, Wood, Masonry and Drywall Coating System
 - .5 Plaster, Wood, Masonry and Drywall - acrylic latex
- .3 These systems are specified in detail in the following paragraphs. For each coating, the required surface preparation, prime coat, intermediate coat (if required), topcoat and coating thicknesses are described. Mil thicknesses shown are minimum dry film thicknesses.

2.2 Exposed Metal Coating Systems

A. System No. 10 - Exposed Metal, Corrosive Environment.

- .1 Type: high-build epoxy finish coat having a minimum volume solids of 60%, with an inorganic zinc prime coat and a pigmented polyurethane finish coat having a minimum volume solids of 52%.
- .2 Service Conditions: for use with metal structures, pipes or valves subjected to water condensation, chemical fumes and chemical contact.
- .3 Surface preparation: SSPC SP-10.
- .4 Prime Coat: self-curing, two component inorganic zinc rich coating recommended by the manufacturer for overcoating with a high build epoxy finish coat. Minimum zinc content shall be 12 pounds per gallon. Apply to a thickness of 3 mils. Products: Devoe Catha-Coat 304 or 304V, Sherwin-Williams Zinc-Clad II Plus, PPG Metalhide 28 Inorganic Zinc-Rich Primer 97-672 or approved equal.
- .5 Intermediate Coat: ICI Devoe Devran 224HS or 231, Sherwin-Williams Macropoxy 646 B58-600, PPG Pitt-Guard Direct-to-Rust Epoxy Mastic Coating 97-145 Series or approved equal: 5 mils.
- .6 Finish Coat: two-component pigmented acrylic or aliphatic polyurethane recommended by the manufacturer for overcoating a high build epoxy coating. Apply to a thickness of at least 2 mils. Products: ICI Devoe Devthane 379, Sherwin-Williams Hi-Solids Polyurethane B65-300, PPG Pitthane Ultra Gloss Urethane Enamel 95-812 series or approved equal.

B. System No. 20 - Exposed Metal, Exterior

- .7 Type: high-build epoxy prime coat with a pigmented high-build aliphatic or acrylic polyurethane finish coat.
- .8 Service Conditions: for use on exterior metal piping appurtenances, such as valve box lids, hydrant heads and guard posts.
- .9 Surface Preparation: SSPC SP-10.
- .10 Prime Coat: two-component high-build epoxy. Apply to a thickness of 8 mils. Products: ICI Devoe 235, Sherwin-Williams Macropoxy 646 B58-600, PPG Pitt-Guard Direct-to-Rust Epoxy Mastic Coating 97-145 series or approved equal.
- .11 Finish Coat: two-component pigmented high-build polyurethane. Apply one or more coats to a total thickness of 5 mils. Products: ICI Devoe Devthane 359, Sherwin-Williams Hi-Solids Polyurethane B65-300 series, PPG Pitthane Ultra Gloss Urethane Enamel 95-812 series or approved equal.

2.3 PVC, CPVC and FRP Coating System

A. System No. 41 - PVC, CPVC and FRP, Ultraviolet Exposure

- .1 Type: epoxy primer with a minimum volume solids of 54% and a pigmented polyurethane enamel having a minimum volume solids of 52%.
- .2 Service Conditions: PVC or CPVC piping and FRP exposed to sunlight.
- .3 Surface Preparation: SSPC SP-1. Then lightly abrade the surface with medium grain garnet paper.
- .4 Prime Coat: one coat of ICI Devoe Devran 224HS, Sherwin-Williams Macropoxy 646 B58 series, PG Pitt-Guard Direct-to-Rust Epoxy Mastic Coating 97-145 series or

approved equal. Apply to a minimum dry film thickness of 4 mils.

- .5 Finish Coat: one coat of ICI Devoe Devran 379, Sherwin-Williams Hi-Solids Polyurethane B65-300 series, PPG Pitthane Ultra Gloss Urethane Enamel 95-812 series or approved equal. Apply to a minimum dry film thickness of 3 mils.

2.4 Metal in Contact with Concrete, Coating System

A. System No. 51 - Aluminum Insulation from Concrete and Carbon Steel:

- .1 Type: high solids epoxy or phenolic epoxy having a minimum volume solids of 80% (ASTM D2697).
- .2 Service Conditions: coat areas of aluminum grating, stairs, framing, structural members or aluminum fabrications in contact with concrete or carbon steel with this system.
- .3 Surface Preparation: solvent or steam cleaning per SSPC SP-1, do not use alkali cleaning. Then dust blast.
- .4 Coating System: apply three or more coats of ICI Devoe Bar-Rust 233H, Sherwin-Williams Macropoxy B58-600, PPG Pitt-Guard Direct-to-Rust Epoxy Mastic Coating 97-145 series or approved equal: 30 mils total. Maximum thickness of an individual coating shall not exceed the manufacturer's recommendation.

2.5 Plaster, Wood, Masonry and Drywall Coating System

A. System No. 60 - Plaster, Wood, Masonry and Drywall, Normal Exposure:

- .1 Type: acrylic latex coating having a minimum volume solids of 40%.
- .2 Service Conditions: for use in coating weather exposed or enclosed concrete masonry, drywall, wood and plaster.
- .3 Surface Preparation: surfaces shall be dry, clean and free of contaminants.
- .4 Prime Coat: self-priming.
- .5 Prime Coat for existing semi-gloss painted walls: gripper primer.
- .6 Finish Coats: two coats of ICI Dulux Professional, 2 mils each; two coats of Sherwin-Williams Metalatex B42 series, 2 mils each; two coats of PPG Pitt-Tech Int/Ext Satin DTM Industrial Enamel 90-474 series, 2 to 3 mils each or approved equal.

2.6 Abrasives for Surface Preparation

- .1 Abrasives used for preparation of iron and steel surfaces shall be one of the following:
 - .1 16 to 30 or 16 to 40 mesh silica sand or mineral grit.
 - .2 20 to 40 mesh garnet.
 - .3 Crushed iron slag, 100% retained on No. 80 mesh.
 - .4 SAE Grade G-40 to G-50 iron or steel grit.
- .2 Abrasives used for preparation of copper and aluminum surfaces shall be one of the following:
 - .1 Crushed slag, 80 to 100 mesh.
 - .2 Very fine silica sand, 80 to 100 mesh.

- .3 In the above gradations, 100% of the material shall pass through the first stated sieve size and 100% shall be retained on the second stated sieve size.

PART 3 - EXECUTION

3.1 Condition of Surfaces

- .1 Proceed with work only when surfaces and conditions are satisfactory for production of a first class job. Commencement of work shall imply acceptance of conditions.
- .2 Remove dust, grease, rust and extraneous matter from all surfaces (except that rust occurring on items specified to be primed under other Sections shall be removed and the work reprimed under those Sections).

3.2 Preparation

- .1 Concrete: test surfaces for alkalinity with pink litmus paper or other recognized method.
- .1 Where extreme alkalinity occurs, wash surfaces with 4% solution tetrapotassium pyrophosphate, 5 oz. per gallon of water where latex base paint is to be used and with zinc sulphate solution, 3 lbs. per gallon of water where other paint bases are to be used.
- .2 Etch normal concrete surfaces to receive finish with muriatic acid solution (1 part commercial 31.45% to 3 parts water).
- .2 Metal: clean unpainted and shop painted metal, remove loose rust and prime bare metal with zinc chromate primer. Feather out edges to make touch up patches inconspicuous.
- .3 Galvanized surfaces: phosphatize galvanized metal surfaces using pretreatment or prime with galvanized metal primer.
- .4 Woodwork:
- .1 Inspect millwork to assure surfaces are smooth, free from machine marks and that nailheads have been countersunk. Seal all knots and sapwood in surfaces to receive paint, with a sealer compatible with finish specified.
- .2 Sand smooth all woodwork which is to be finished and clean surfaces free of dust before applying first coat. In the case of painted woodwork, fill nail holes, splits and scratches with non-shrinking filler after first coat is dry. When these occur on a surface to receive a transparent finish, use putty tinted to match local grain condition. Between coats sand lightly and remove dust.
- .5 Hardware: remove finishing hardware, electric plates and accessories, mask any that are not removable. Replace these when paint is dry and clean them. Do not clean hardware with solvent that will remove permanent lacquer finish.

3.3 Application

- .1 The applicator of this Section shall assume a minimum of 6 different paint colours to be used throughout the building.

- .2 Finishes and number of coats specified in the Coating Finish Schedule are intended to cover surfaces completely. If they do not, apply further coats until complete coverage is achieved as required.
- .3 Any areas exhibiting incomplete or unsatisfactory coverage shall have the entire plane painted. Patching will not be acceptable.
- .4 Spraying will not be allowed without written permission of the Consultant.
- .5 Arrange to have traffic barred from completed areas wherever possible.
- .6 Apply materials in strict accordance with manufacturer's directions and specifications and be familiar with same. Do not use adulterants.
- .7 Prime woodwork designated for painting as soon as possible after woodwork is delivered to site. Prime all surfaces of such woodwork, whether exposed or not, before installation. Back prime woodwork which is to receive transparent finish with one coat of transparent finish reduced 25%.
- .8 Apply primer-sealer and finish coats by brush or roller method. Permit paint to dry minimum 24 hours before applying succeeding coats, touch up section spots and sand between coats.
- .9 Where two coats of the same paint are to be applied, tint the first coat to differentiate from the final coat.
- .10 Exterior paints shall be factory tinted to required colours.
- .11 Apply final coats on smooth surfaces by roller or brush. Hand brush wood surfaces.
- .12 Paint shall be uniform in sheen, colour and texture, free from brush or roller marks, sags, runs or other defects.

3.4 Mechanical and Electrical Work

- .1 Read Mechanical and Electrical Sections and refer to the Drawings for the extent of painting work to be done under those sections.
 - .2 Finish paint primed mechanical equipment, heaters, convectors, radiators, fan units.
 - .3 Finish paint all primed and factory finished mechanical and electrical equipment such as heaters, convectors, hose cabinets, radiators, electrical panels, fan units, outlet boxes, junction boxes, pull boxes, access panels, grilles, etc..
 - .4 Paint insulated and bare pipes. Paint all exposed ductwork.
 - .5 Prime and paint exposed, unfinished electrical raceways, fittings, outlet boxes, junction boxes, pull boxes, and similar items. Replace identification markings on mechanical and electrical work when painted over or spattered.
 - .6 Remove grilles, covers, access panels for mechanical and electrical systems from installed location and paint separately.
 - .7 Paint work to match adjacent walls and ceilings unless directed otherwise.
 - .8 Where walls and ceilings are not scheduled to be painted, said work shall be painted a colour selected by the Consultant except where galvanized or plated.
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3.5 Field Quality Control

- .1 If requested, locate testing area in building to establish standard of workmanship, texture, gloss and coverage where designated.
- .2 Apply samples of all finishes on each type of surface to be coated with correct material, number of coats, colour, texture and degree of gloss required.
- .3 Retain test area until completion of work. Use approved work in test areas as standard for corresponding work throughout building. Correct and refinish work which does not compare with approved finishes.

3.6 Weather Conditions

- .1 Do not paint in the rain, wind, snow, mist and fog or when steel or metal surface temperatures are less than 5 degrees F above the dew point.
- .2 Do not apply paint when the relative humidity is above 85% or the temperature is above 90 degrees F.
- .3 Do not paint when temperature of metal to be painted is above 120 degrees F.
- .4 Do not apply paints if air or surface temperature is below 40 degrees F or expected to be below 40 degrees F within 24 hours.
- .5 Do not apply epoxy, acrylic latex and polyurethane paints on an exterior or interior surface if air or surface temperature is below 60 degrees F or expected to drop below 60 degrees F.

3.7 Field Touch-Up of Shop-'Applied Prime Coats

- .1 Remove oil and grease surface contaminants on metal surfaces in accordance with SSPC SP-1. Use clean rags wetted with a degreasing solution, rinse with clean water and wipe dry.
 - .2 Remove dust, dirt, salts, moisture, chalking primers or other surface contaminants that will affect the adhesion or durability of the coating system. Use a high pressure water blaster or scrub surfaces with a broom or brush wetted with a solution of trisodium phosphate, detergent and water. Before applying intermediate or finish coats to inorganic zinc primers, remove any soluble zinc salts that have formed by means of scrubbing with a stiff bristle brush. Rinse scrubbed surfaces with clean water.
 - .3 Remove loose or peeling primer and other surface contaminants not easily removed by the previous cleaning methods in accordance with SSPC SP-7. Take care that remaining primers are not damaged by the blast cleaning operation. Remaining primers shall be firmly bonded to the steel surfaces with blast cleaned edges feathered.
 - .4 Use repair procedures on damaged primer which protects adjacent primer. Blast cleaning may require the use of lower air pressure, smaller nozzles and abrasive particle sizes, short blast nozzle distance from surface, shielding and/or masking.
 - .5 After abrasive blast cleaning of damaged and defective areas, remove dust, blast particles and other debris by dusting, sweeping and vacuuming; then apply the specified touch-up coating.
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- .6 Surfaces that are shop primed with inorganic zinc primers shall receive a field touch-up of organic zinc primer to cover all scratches or abraded areas.
- .7 Other surfaces that are shop primed shall receive a field touch-up of the same primer used in the original prime coat.

3.8 Paint Mixing

- .1 Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touchup painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix additional components for reasons of colour or otherwise, even within the same generic type of coating.

3.9 Procedures for the Application of Coatings

- .1 Conform to the requirements of SSPC PA-1. Follow the recommendations of the coating manufacturer including the selection of spray equipment, brushes, rollers, cleaners, thinners, mixing, drying time, temperature and humidity of application and safety precautions.
 - .2 Stir, strain and keep coating materials at a uniform consistency during application. Apply each coating evenly, free of brush marks, sags, runs, holidays and other evidence of poor workmanship. Use a different shade or tint on succeeding coating applications to indicate coverage where possible. Finished surfaces shall be free from defects or blemishes.
 - .3 Do not use thinners unless recommended by the coating manufacturer. If thinning is allowed, do not exceed the maximum allowable amount of thinner per gallon of coating material. Stir coating materials at all times when adding thinner. Do not flood the coating material surface with thinner prior to mixing. Do not reduce coating materials more than is absolutely necessary to obtain the proper application characteristics and to obtain the specified dry-film thicknesses.
 - .4 Remove dust, blast particles and other debris from blast cleaned surfaces by dusting, sweeping and vacuuming. Allow ventilator fans to clean airborne dust to provide good visibility of working area prior to coating applications. Remove dust from coated surfaces by dusting, sweeping and vacuuming prior to applying succeeding coats.
 - .5 Apply coating systems to the specified minimum dry-film thicknesses as measured from above the peaks of the surface profile.
 - .6 Apply primer immediately after blast cleaning and before any surface rusting occurs, or any dust, dirt, or any foreign matter has accumulated. Reclean surfaces by blast cleaning that have surface coloured or become moist prior to coating application.
 - .7 Apply a brush coat of primer on welds, sharp edges, nuts, bolts and irregular surfaces prior to the application of the primer and finish coat. The brush coat shall be done prior to and in conjunction with the spray coat application. Apply the spray coat over the brush coat.
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3.10 Surface Not to be Coated

- .1 Do not paint the following surfaces unless otherwise noted on the drawings or in other Standard Specification sections. Protect during the painting of adjacent areas:
 - .1 Cement mortar coated pipe and fittings.
 - .2 Stainless steel.
 - .3 Metal plates/nameplates or letters.
 - .4 Concrete surfaces.
 - .5 Fencing.
 - .6 Copper tubing, red brass piping and PVC piping except where such piping occurs in room shower the walls are painted, or required for colour coding.
 - .7 Electrical fixtures except for factory coatings.
 - .8 Grease fittings.
 - .9 Buried pipe unless specifically required in the piping specifications.
 - .10 Fiberglass items.
 - .11 Aluminum handrails, stairs and grating, unless in contact with concrete.

3.11 Protection of Surfaces Not to be Painted

- .1 Remove, ask or otherwise protect hardware, lighting fixtures, switchplates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Mask openings in motors to prevent paint and other materials from entering the motors.

3.12 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.

APPENDIX 'A'

3.13 Paint Material Standard

- .1 Painting and finishing materials for the work of Section 09900 shall be the manufacturer's top line in each case. Manufacturer's top line materials will be acceptable only if they conform to or exceed the requirements of the following CGSB quality standards, and other requirements listed below as applicable for this project:
 - .1 Oil, linseed, raw: to 1-GP-1d
 - .2 Oil, linseed, boiled: to 1-GP-2d
 - .3 Thinner, petroleum spirits (mineral spirits): to 1-GP-4M
 - .4 Thinner, petroleum spirits, low flash: to 1-GP-5M
 - .5 Exterior house paint, white and tints: 1-GP-28M
 - .6 Varnish, interior: to 1-GP-36c
 - .7 Undercoater, enamel, interior (wood): to 1-GP-38M
 - .8 Primer, steel, oil-alkyd (zinc chromate) (zinc yellow): to 1-GP-40d
 - .9 Paint, exterior, solid color, type 1 oil, type 2 alkyd: to 1-GP-41d
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- .10 Enamel, interior, alkyd, semi-gloss: to 1-GP-57f
 - .11 Enamel, interior, alkyd, gloss: to 1-GP-60d
 - .12 Enamel, interior, alkyd, flat: to 1-GP-118b
 - .13 Enamel, exterior, alkyd: to 1-GP-59f
 - .14 Primer-sealer, interior, solvent type: to 1-GP-68c
 - .15 Primer-sealer, latex: to 1-GP-119b
 - .16 Urethane varnish: to 1-GP-175a
 - .17 Stain, oil, pigmented, exterior (type 1), interior (type 2):
to 1-GP-145b
 - .18 Zinc rich primer: to 1-GP-181b
 - .19 Pre-treatment for galvanized steel: "Lithoform No. 2" or "Galvaprep No.5",
both made by Anchem Products Inc., or special primer for galvanized steel
made by manufacturer of top coats
 - .20 Galvanized metal primer: "Alkyd/Calcium Plumbate," "No. 52 Galvaprime" by
Para Paints Limited, or approved equal
 - .21 Fire retardant and fire resistant paints: as manufactured by CANO COATINGS,
and supplied by Pink Sheild, tel 403-279-6420
 - .22 Thermoplastic wall coating: to 1-GP-71
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 04200 Unit Masonry
- .2 Section 06200 Finish Carpentry
- .3 Section 09250 Gypsum Board
- .4 Section 09310 Ceramic Tile
- .5 Section 10800 Washroom Accessories

1.3 Work Included

- .1 The work covered by this Section includes the manufacture, delivery, and installation of all laminated plastic toilet partitions and urinal screens including hardware, shown or scheduled on the Drawings or in the Specification.

1.4 Shop Drawings

- .1 Submit shop drawing in accordance with Section 01000 General Requirements. Indicate colour, materials, thicknesses, connection and fastening details, plans, elevations, hardware, fabrication and installation details and any other pertinent information.

1.5 Maintenance Data

- .1 Provide maintenance data for laminated plastic partitions specified in this Section.

1.6 Protection

- .1 Protect finished surfaces during shipment and installation. Do not remove protection until immediately prior to final inspection.

1.7 Warranty

- .1 Warranty in accordance with Section 01000 General Requirements, and manufacturer's standard 25 year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, defects in material and workmanship for stainless steel door hardware and mounting brackets.

PART 2 - PRODUCTS

2.1 Manufacturers

- .1 Acceptable Manufacturer: Bobrick Washroom Equipment Inc. info@bobrick.com;
www.bobrick.com
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2.2 General

- .1 Toilet partitions: shall be solid colour reinforced composite partitions: Bobrick Sierra Series.
 - .1 Design Type: Standard Height
 - .2 Privacy Style Partitions: No sight lines with gap-free interlocking doors and stiles routed 0.300 inches from the edge to allow for 0.175 inch overlap to prevent line-of-sight into the toilet compartment. Privacy strips fastened or adhered onto the partition material are not acceptable.
 - .3 Mounting: Floor-mounted, overhead-braced with satin finish, extruded anodized aluminum headrails, 0.065 inch (1.65mm) thick with anti-grip profile.
- .2 Urinal Screens
 - .1 Wall Hung: Screen Height: 42 inches (107cm) with 18 inches (46cm) floor clearance.
- .3 Materials: Solid colour reinforced composite (SCRC) material for stiles, panels, doors, and screens with Bobrick GraffitiOFF coating, thermoset and integrally fused into homogenous piece; high density polyethylene (HDPE), high density polypropylene not acceptable.
 - .1 Composition: Dyes, organic fibrous material, and polycarbonate/phenolic resins.
 - .2 Surface Treatment: Non-ghosting, graffiti resistant surface integrally bonded to core through manufacturing steps requiring thermal and mechanical pressure.
 - .3 Edges: Same colour as the surface.
 - .4 Colour:
 - .1 As selected by Architect from manufacturer's standard SierraSeries range.
 - .2 SC01 Golden Khaki
 - .3 SC02 Desert Beige
 - .4 SC03 Terra Cotta
 - .5 SC04 Forest Green
- .4 Finished Thickness
 - .1 Stiles and Doors: 3/4 inch (19mm)
 - .2 Panels and Screens: 1/2 inch (13mm)
- .5 Stiles: Floor-anchored stiles furnished with expansion shields and threaded rods.
 - .1 Levelling Devices: 7 gauge, 3/16 inches (5mm) thick, corrosion-resistant, chromate-treated, double zinc-plated steel angle levelling bar bolted to stile; furnished with 3/8 inch (*10mm) diameter threaded rods, hex nuts, lock washers, flat washers, spacer sleeves, expansion anchors, and shoe retainers.
 - .2 Stile Shoes: One-piece, 22 gauge (0.8mm) 18-8, Type 304 stainless steel, 4 inch (102mm) height; tops with 90 degree return to stile. One-piece shoe capable of adapting to 3/4 inch (19mm) or 1 inch (25mm) stile thickness and capable of being fastened (by clip) to stiles starting at wall line.

PART 3 - EXECUTION

3.1 Preparation

- .1 Prepare substrates including but not limited to blocking and supports in walls and ceiling at points of attachment using methods recommended by the manufacturer for achieving the best result for the substrates under the project conditions.
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- .1 Inspect areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
- .2 Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.
- .2 If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- .3 Do not proceed with installation until substrates have been properly prepared with blocking and supports in walls and ceilings at points of attachment and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

3.2 Installation

- .1 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - .1 Verify blocking and supports in walls and ceilings has been installed properly at points of attachment.
 - .2 Verify location does not interfere with door swings or use of fixtures.
 - .3 Use fasteners and anchors suitable for substrate and project conditions.
 - .4 Install units rigid, straight, plumb, and level.
 - .5 Conceal evidence of drilling, cutting, and fitting to room finish.
 - .6 Test for proper operation.

3.3 Adjusting, Cleaning, and Protection

- .1 Adjust hardware for proper operation after installation. Set hinge cam on in-swinging doors to hold doors open when unlatched. Set hinge on out-swinging doors to hold unlatched doors in closed position.
 - .2 Touch-up, repair, or replace damaged products.
 - .3 Clean exposed surfaces of compartments, hardware, and fittings.
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PART 1 - GENERAL

1.1 General Requirements

- .1 Conform to Division 1 General Requirements.

1.2 Related Work

- .1 Section 04200 Unit Masonry
- .2 Section 06200 Finish Carpentry
- .3 Section 09310 Ceramic Tile
- .4 Section 10150 Compartments and Cubicles

1.3 Work Included

- .1 The work covered by this section includes the supply and installation of all washroom accessories, including but not necessarily limited to mirrors, grab bars, robe and coat hooks, soap dispensers, mirrors, garbage disposal, toilet paper dispensers, and change tables.

1.4 Shop Drawings

- .1 Submit shop drawings, catalogue illustrations. Indicate size, description of components, base material, surface finish inside and outside, hardware, locks, attachment devices, description of rough-in frame, indicating fastening and installation.

1.5 Workmanship

- .1 All work shall be done by mechanics skilled in their respective trades in order to produce first class workmanship.

PART 2 - PRODUCTS

2.1 Materials

- .1 Washroom accessories: as noted on the drawings. Refer to Washroom Accessories, sub-section 2.2 of this Section, for manufacturers and model numbers.
- .2 Fasteners: screws and bolts to be hot dipped galvanized. Expansion shields to be fibre, lead, or rubber as recommended by fixture manufacturer for specific component and intended use. Provide templates and instructions for supporting devices built into walls or other surfaces.
- .3 Adhesive: epoxy type contact cement.

2.2 Washroom Accessories Legend

- .1 Toilet Tissue Dispenser: Frost Code 169 Twin Jumbo toilet tissue dispenser, stainless steel, 304 number 4 finish.
 - .2 Mirrors:
 - .1 Mirrors in WR's to be 24" x 36". Solid Frame Mirror Frost Code 941-2436
 - .3 Robe hooks: Henkel Hook - to be installed where noted on drawings.
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- .4 Grab bars: S.S., peened finish, exposed mounting
 - .1 Where shown on drawings (beside urinals and behind toilets) - Frost code 1001 - 24".
 - .2 Beside B/F toilets: Frost Code 1003 - 30" horizontal and 30" vertical "L" shape.
- .5 Soap Dispenser: Frost Code 710A, all purpose valve, horizontal mounting.
- .6 Napkin Disposal - Frost Code 625, surface mounted napkin disposal - stainless steel type 304 No. 4 Brushed Finished.
- .7 Shelf: heavy duty, Gamco MS Shelf, 18" x 4", stainless steel.
- .8 Paper Towel Dispenser: Frost Code 103.

PART 3 - EXECUTION

3.1 Installation

- .1 Installation to be by Section 06200 Finish Carpentry.
- .2 Verify exact location of washroom equipment prior to installation.
- .3 Install equipment as per manufacturer's instructions.
- .4 Install all accessories in conformance to 2012 OBC (Section 3.8) Mounting Heights.

3.2 Clean Up

- .1 On completion of the work of this section, all protection erected under this section shall be removed, all damage to this work and to the work of other trades resulting from the execution of the work of this section shall be made good, and all surplus materials, debris, tools, plant, and equipment shall be removed from the premises, and the building(s) and site left in a condition satisfactory to the Consultant.
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