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PROJECT MANUAL
FOR

COMFORT STATION

FOR

WINNIPEG TRANSIT

DATE OF ISSUE: June 20, 2013
Issued for Tender & Construction

SET NUMBER_____

12-010

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1.0 SETTING OUT

1.1 Lay out work with reference to existing conditions and as shown on drawings.

1.2 Verify grades, lines, levels where applicable and dimensions indicated and report any errors or inconsistencies to the Consultant before commencing work. Confirm job dimensions at once to allow prompt checking of shop and other drawings.

1.3 Locate and fix location of services, walls, partitions, shafts and all parts of the construction, as work proceeds.

2.0 BUILDING DIMENSIONS

2.1 Ensure that necessary job dimensions are taken and trades are coordinated for the proper execution of the work. Assume complete responsibility for the accuracy, completeness and coordination of such dimensions.

2.2 Verify that work as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels as set out by requirements of the drawings, and ensure that work installed in error is rectified before construction continues.

2.3 Check and verify dimensions referring to work and interfacing of services. Dimensions, when pertaining to the work of other trades, shall be verified with the trade concerned. Ensure that Subcontractors from various trades cooperate for the proper performance of the work.

2.4 Do not scale directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Any change through the disregarding of this clause shall be the responsibility of the Contractor.

2.5 All details and measurements of any work which is to fit or to conform with work installed shall be taken at the site.

3.0 CERTIFICATION

3.1 Furnish to Owner & Consultant, verification in the form of a drawing from a licenses Provincial Land Surveyor that the building and its various parts are located in accordance with Contract requirements.

3.2 The surveyor's certification shall represent independent and disinterested verification of Contractor's layout work. Selection of a Surveyor for this purpose shall be subject to Owner's approval. Surveyor shall not be a regular employee of Contractor, nor shall he have any interest in the Contract.

3.3 The surveyor's certification shall be in the form of signed original drawings showing exact location of exterior wall lines and foundations, final finished grades, note exceptions or deviations from contract drawings, and location of all buried services

- END OF SECTION -

1.0 LAWS, ORDINANCES, RULES, REGULATIONS, NOTICES, PERMITS, LICENCES, CERTIFICATES

1.1 All information contained in the drawings and specifications is intended to be in compliance with the requirements of any law, bylaw, code or regulation of municipal, provincial or other authorities having jurisdiction.

1.2 Comply with the local building codes, laws, ordinances, rules, regulations, codes and orders of all authorities having jurisdiction relating to the work, to the preservation of the public health and construction safety which are or become in force during the performance of the work.

1.3 Submit and pay for inspection certificates and approvals where applicable, as evidence that installed work conforms with regulations of authorities having jurisdiction.

1.4 Pay all assessments for Unemployment Insurance and Canada Pension as required by the Provincial or Federal Government and for Workers' Compensation as required by the Workers' Compensation Board.

1.5 Make all deductions from wages paid and make all remittances with respect to Income Tax, Unemployment Insurance and Provincial Hospital Insurance as required by law.

1.6 Refer to Instructions to Bidders for Building Permit and other permits, licences, etc., required for the execution of the work of this project. Contractor to call for final inspections and issue final certificates.

2.0 PATENTS

2.1 The Contractor shall pay all royalties and license fees and shall indemnify and save the Owner, harmless from and against any and all loss, costs (including costs as between solicitor and client), changes, damages, claims and demands whatsoever, which may arise by reason of the work on account of or because of infringement of patents in force at the time of the signing of the Contract Documents.

3.0 FIRE SAFETY FEATURES

3.1 The Contractor shall ensure that all fire safety features called for in the Contract Documents are supplied and installed to meet fire safety standards established by the authorities having jurisdiction. The Contractor shall ensure that the work of Subcontractors is properly coordinated to achieve the intent of this specification.

3.2 The Contractor shall ensure that:

.1 Where fire rated partitions are specified, cartons in which such materials are delivered to the site have Underwriters' Laboratories labels indicating the fire resistive ratings.

.2 All trades affected are fully acquainted with the requirements of this Article.

- END OF SECTION -

1.0 REFERENCE ABBREVIATIONS

1.1 The following Reference Abbreviations when used within the Contract Documents shall have the meanings listed below:

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASHRAE	American Society of Heating Refrigeration and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
AWMAC	American Woodwork Manufacturers' Association of Canada
AWI	American Woodwork Institute
CEC	Canadian Electrical Code
CGSB	Canadian General Standards Board
CISC	Canadian Institute of Steel Construction
CITC	Canadian Institute of Timber Construction
CLA	Canadian Lumbermans' Association
COFI	Council of Forest Industries of BC
CSA	Canadian Standards Association
CWC	Canadian Wood Council
IAO	Insurers Advisory Organization
MOT	Ministry of Transportation
NAAMM	National Association of Metal Manufacturers
NBCC	National Building Code of Canada
NFPA	National Fire Protection Association
NHLA	National Hardwood Lumber Association
NLGA	National Lumber Grades Authority
TTMAC	Terrazzo Tile and Marble Association of Canada
ULC	Underwriters' Laboratories of Canada
ULI	Underwriters' Laboratories Inc.
WHI	Warnock Hersey International

- END OF SECTION -

1.0 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1. This Contract includes all work, materials and procedures as indicated on the drawings and in the specifications and other documents referenced or related to this project.
2. Work under this Contract covers:
   - .1 Demolition and removal of the existing Comfort Station and prepping the site for the construction of the new Comfort Station.
   - .2 Setting out and construction of a new Comfort Station for Winnipeg Transit on the City's bus loop premise.
   - .3 The general spirit and intent of the Drawings and Specifications to be taken shall be that a complete job is called for.

1.2 CODES AND STANDARDS

1. All work shall be in accordance with latest issue of the applicable regulations and standards listed below and as stated in the project specifications:
   - .1 Manitoba Building Code
   - .2 Manitoba Fire Code
   - .3 Federal, Provincial and Municipal government laws, ordinances and codes, where such standard laws, rules, ordinances and codes are applicable.
2. Work shall meet or exceed requirements of specified standards, codes and referenced documents. Even if permitted by preceding regulations and standards, grade of work shall in no case be lower than specified in the project specifications.
3. Electrical components and equipment which are not CSA approved shall be approved by the Manitoba Department of Labour and Manpower prior to connection to the electrical service. Pay for all costs associated with obtaining the necessary approval.
4. Unless specified otherwise, Contractor shall at his own expense obtain all required permits and certificates of inspection and approval from proper authorities. These shall be turned over to the Consultant prior to Certificate of Substantial Performance being issued.

1.3 SETTING OUT OF WORK

1. Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
2. Provide devices needed to lay out and construct work.
3. Supply such devices as straight edges and templates required to facilitate Consultant's inspection of the work.

1.4 CONTRACTOR USE OF SITE

1. Use of site: limited to areas indicated on plans for work and storage.
2. Do not unreasonably encumber site with materials or equipment.
3. Move stored products or equipment which interferes with operations of owner or other contractors.

4. Obtain and pay for use of additional storage or work areas needed for operations or for delivered equipment or materials not required immediately on site.

5. Keep all fire lanes, egress and access routes clear at all times.

1.5 PLANNING OF WORK

1. Adjacent site area of driveway and bus loop will be kept operational and accessible at all times by the owner during term of this contract.

1.6 OCCUPANCY BY OWNER

1. The owner has right to enter and occupy building in whole or in part before completion of Contract provided that, in the opinion of Consultant, such entry and occupancy does not prevent or interfere with Contractor in completion of Contract.

2.0 **PRODUCTS (NOT APPLICABLE)**

3.0 **EXECUTION (NOT APPLICABLE)**

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Section includes administrative provisions for coordinating construction operations for the Project including, but not limited to, the following:

1. General project coordination procedures.
2. Administrative and supervisory personnel.
3. Project meetings.

1.2 RELATED SECTIONS

.1	Summary of Work	Section 01110
.2	Contract Closeout	Section 01700

1.3 DESCRIPTION

.1 Coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other contractors and subcontractors under instructions of Consultants.

.2 Be fully responsible for the care and control of the project and the site. Ensure that the project is carried forward in a proper manner and as expeditiously as possible.

.3 Coordinate and direct all trades and be responsible for division of work between trades, including any jurisdictional involvements.

.4 Be responsible for scheduling of materials and exchange of information between trades for execution and completion of work, such as, shop drawings, progress schedules, articles to be built in and location of openings.

.5 Coordinate and conduct Orientation / Educational / Coordination meetings required under various Sections regarding Workplace Health & Safety, Waste Disposal and Recycling and any other meetings called for.

1.4 EXAMINATION AND FIELD MEASUREMENTS

.1 Check and verify dimensions relating to the work. Verify dimensions affecting work of other trades with trades concerned. Check dimensions and actual material to be used on the work with drawings for interfacing including existing work before work commences. Report any variations for adjustment if necessary.

.2 Examine surfaces and structures underlying, or adjacent to the work to be installed or affecting work to be executed.

.3 Commencement of work implies acceptance of all existing conditions and no extra claims based on these conditions will be permitted.

.4 Where field measurements are not available before fabrication is commenced, required dimensions shall be submitted by the trades concerned.

.5 Drawings are, in part, diagrammatic and are intended to convey scope of work and indicate general and approximate location, arrangement and sizes of items and equipment. Obtain more accurate information about locations, arrangement and sizes from study and coordination of shop drawings, including pertinent Architectural, Structural, Mechanical and Electrical drawings and become familiar with conditions and space affecting these matters

before proceeding with work.

.6 It shall be Contractor's responsibility that specifications, drawings, job conditions, and other technical information are examined and job dimensions checked by his Subcontractors, suppliers and by his own forces and that the requirements of the Contract are clearly understood and followed by all trades in the execution of the work.

1.5 PROJECT MEETINGS

.1 Conduct monthly job meetings of parties concerned with the progress of the project. When progress of work requires more frequent job meetings, a new schedule of job meetings will be arranged between parties concerned.

.2 The contractor will record the minutes of each meeting, attendance and distribute copies to all parties involved.

1.6 CONSTRUCTION ORGANIZATION AND START-UP

.1 Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Establish time and location of meetings and notify parties concerned minimum 5 days before meeting.

.3 Agenda to include following:

.1 Appointment of official representative of participants in Work
.2 Schedule of Work.
.3 Schedule of submission of shop drawings, samples, colour chips in accordance with Section 01330 - Submittal Procedures.
.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01510 - Temporary Utilities.
.5 Delivery schedule of specified equipment.
.6 Site security.
.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
.8 Record drawings in accordance with Section 01700 – Contract Closeout.
.9 Monthly progress claims, administrative procedures, photographs, and holdbacks.
.10 Appointment of inspection and testing agencies.
.11 Insurances and transcript of policies.

.4 During construction coordinate use of site and facilities through Consultant / Owner’s procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.

1.7 ON-SITE DOCUMENTS

.1 Maintain at job site, one copy each of the following:

.1 Contract drawings and Specifications
.2 Addenda.
.3 Reviewed shop drawings.
.4 Change orders.
.5 Other modifications to Contract.
.6 Field test reports.
.7 Copy of approved Work schedule.
.8 Manufacturers' installation and application instructions.

.9 Labour conditions and wage schedules.

1.8 SCHEDULES

.1 Submit preliminary construction progress schedule in accordance with Section 01320 - Construction Progress Documents to Consultants coordinated with Consultants' project schedule. Schedule to show anticipated progress stages and final completion of work within time period required by contract documents.

.2 After review, revise and resubmit schedule to comply with revised project schedule.

.3 During progress of Work revise and resubmit as directed by Consultant / Owner.

1.9 SUBMITTALS

.1 Make submittal to Consultants for review. Submit preliminary shop drawings, product data and samples in accordance with Section 01330 for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Consultants.

.2 Submit requests for interpretation of Contract Documents, and obtain instructions through Consultants.

.3 Deliver closeout submittals for review and preliminary inspections, for transmittal to Consultants.

1.10 COORDINATION DRAWINGS

.1 Provide information required by Consultants for preparation of coordination drawings.

.2 Review and approve revised drawings for submittal to Consultants.

.3 Consultants may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in contract documents.

1.11 CLOSEOUT PROCEDURES

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

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

.3 Comply with Consultants' instructions for correction of items of Work listed in executed certificate of Substantial Performance and for access to Owner-occupied areas.

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

2.0 PRODUCTS

Not Used

3.0 EXECUTION

Not Used

- END OF SECTION -

1.0 GENERAL

1.1 SHOP DRAWINGS

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the work.

.2 The Contractor shall arrange for the preparation of clearly identified shop drawings as called for by the Contract Documents or as the Consultant may reasonably request.

.1 Drawings shall be prepared by qualified draftsmen, shall show project title and shall be properly dimensioned, detailed, dated, checked, initialled, and certified by responsible supplier. Shop drawings shall be checked by the Contractor and shall bear his stamp of approval before submission. Provide a 40 mm x 40 mm clear space for Consultant's stamp.

.2 Shop drawings shall show:

a) The stamp or seal of a Professional Engineer registered in the province where the work is being performed, for work required by the specifications to be professionally designed.
b) Fabrication and erection dimensions.
c) Sections, arrangements and details which indicate complete construction, as well as all interconnections with other work.
d) Location and type of exposed anchors and fastenings.
e) Kinds of materials and finishes.
f) Descriptive names of equipment and mechanical and electrical characteristics when applicable.
g) Data verifying that superimposed loads will not affect function, appearance and safety of work shown on shop drawings, as well as other work interconnected.
h) Assumed design loadings, all dimensions of elements and material specifications for all load-bearing members.
i) Proposed chases, sleeves, cuts and holes in structural members.

.3 Manufacturers' printed data sheets for standard items will be acceptable providing all pertinent characteristics are identified and relate to the actual item to be supplied. Submit six (6) copies minimum.

a) Delete information which is not applicable to project.
b) Show dimensions and clearances required.
c) Show performance characteristics and capacities.
d) Show wiring diagrams (when applicable) and controls.
e) Poor quality reproductions will not be accepted.
f) Provide space on one sided copies for Consultant's stamp.

.4 All items shown on shop drawings shall meet the requirements of the Contract Documents and job conditions.

.3 Prior to submission to the Consultant, the Contractor shall review all shop drawings. By this review the Contractor represents that he has determined and verified all field measurements,

field construction criteria, materials, catalogue numbers and similar data or will do so, and that he has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents.

.1 The Contractor's review of each shop drawing shall be indicated by stamp, date and signature of a responsible person.

.2 Notify the Consultant in writing of any changes from the Contract Documents.

.4 The Contractor shall submit shop drawings to the Consultant for his review with reasonable promptness and in orderly sequence so as to cause no delay in the work or in the work of other Contractors.

.5 The Consultant's review will be for conformity to the design concept and for general arrangement only, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the Contract Documents unless a deviation on the shop drawings has been approved separately in writing by the Consultant.

.1 The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all Subcontractors.

.6 The Contractor shall make any changes in shop drawings which the Consultant may require consistent with the Contract Documents and resubmit unless otherwise directed by the Consultant. When resubmitting, the Contractor shall notify the Consultant in writing of any revisions other than those requested by the Consultant.

.7 Submit shop drawings to the Consultant in the form of one "sepia" (reproducible) and three (3) white prints of each or electronic copy in PDF format.. Only the "sepia" will be returned to the Contractor. "Certified" copies or pages from manufacturer's catalogues are not required by the Consultant unless otherwise specified or requested.

.1 One copy of each "Reviewed-as-noted" drawing and "Certified" copies of pages from manufacturer's catalogue shall be available at the site office.

.2 Submit an updated copy of Shop Drawing Index to the Consultant.

.8 It shall be clearly understood that the Contractor and each Subcontractor is expected to operate as an expert in his respective field. Qualified professional personnel shall be responsible for design and detailing. Sufficient study must be exercised during preparation of shop drawings to develop from Consultant's drawings and specifications practical and satisfactory results insofar as use of materials, erection and coordination with other trades are concerned. The Contractor shall save the Owner and Consultants harmless from any defects resulting from failure in this regard, including the cost of remedial action necessary before or after completion of the work.

.9 Prior to the cutting of any structural member, submit to the Consultant properly dimensioned drawings showing proposed chasing, sleeving, cutting and drilling of structural members. Do not proceed until written approval has been given.

.10 Contractor shall be responsible for submission and approval of shop drawings by authorities having jurisdiction as required by local rules, laws or regulations prior to submission to the Consultant.

1.2 SAMPLES

.1 Submit samples of the size and quantity specified, three minimum, for the various materials prepaid to the Owner's address. Mark samples on the back to show type of material, producer's name, Subcontractor's name, and the project name. Where changes or modifications of the materials for which samples are submitted are required consistent with the Contract Documents, resubmit samples with the required changes or modifications. Such changes or modifications shall not affect the Contract Sum.

.2 Approved samples will serve as a model against which the products incorporated in the work shall be judged. Keep one approved sample in a locked cabinet in the field office.

.3 Products incorporated in the work shall match the approved samples.

.4 Submit finish range samples for approval before proceeding with production. Use these samples for comparison purposes during production finishing. Make samples large enough so that a good comparison can be made to establish allowable range.

.5 Samples shall become the property of the Owner.

1.3 PROGRESS REPORTS

.1 Keep a permanent written record on the site of the daily progress of the work ready for inspection at all reasonable times. Submit a copy of the report upon request.

.2 Show the dates of commencement and completion of the different trades and parts of the work, number of men engaged on the work (including all sub-trades), and the division of the work and include particulars regarding daily weather conditions and temperature.

.3 Submit a summary of the daily reports upon request by the Owner.

1.4 PROGRESS PHOTOGRAPHS

.1 Upon commencement of the work and at weekly intervals until work is completed, take twenty-four coloured photographs or digital pictures at locations of the building as selected by the Consultant, showing progress of the work.

.2 Submit two copies of each photograph or one copy of digital pictures on a disk or CD.

.3 Include for the total number of photographs, but the Consultant shall have the right to request that fewer photographs be taken at certain intervals, so that more photographs may be taken at other times, providing that the total number of photographs taken remains the same. (5' x 7')

.4 The prints shall be of a size agreed to by the owner, and glossy finish.

.1 Each photograph shall have at the lower right-hand corner a white patch with the name of the project and the date and location of the exposure.

1.5 OTHER SUBMISSIONS

.1 Submit Reports and Schedules called for under various Sections.

1.6 MAINTENANCE (O & M) MANUALS

.1 When work is complete, submit three copies of all Warranties, manufacturer's literature and other information for materials and equipment as listed in various sections of the specification (including Divisions 15 and 16).

.2 Submit complete Operation and Maintenance Manuals to Consultants for review and approval 4 weeks prior to application for Substantial Performance of Work.

.3 Compile copies in sets, each set placed in 216 mm x 280 mm size, hard cover, 3-ring binder manuals. Label manuals and arrange information in sections according to material and equipment.

.1 Identify each volume with types or printed title "Operating and Maintenance Instructions" with the following information on the cover:

a) Title of Project.
b) Name of Contractor
c) General Subject covered in the specific volume.

.2 Each volume to have neatly typewritten table of contents arranged in a systematic order following the specification format and include the following:

a) All items that require maintenance information.
b) Copies of all shop drawings and product data sheets.
c) List of all consultant, contractor, sub-contractors, with their telephone and fax numbers, contract person, and address.
d) Copies of all consultant and local authorities inspection reports.
e) Copies of all permits.
f) Copies of all testing agencies reports and findings.
g) Warranties and Guaranties.
h) Balance Reports.
i) Final Property Survey including area certification.

.4 Submit all information essential for proper care and maintenance in the form of manufacturer's printed literature amended where necessary to be specific, and supplemented by typewritten sheets where necessary. In addition to other requirements specified, submit:

.1 Detailed instructions and recommended materials for cleaning and warnings of detrimental maintenance practices.

.2 Detailed instructions for operation and maintenance, adjustment, inspection, lubrication and parts replacement for all mechanically and electrically operated items.

.3 Name of manufacturer, supplier, installing and service companies as applicable, and their local representatives, complete with addresses and telephone numbers.

.5 Manuals must be approved prior to Substantial Performance of Work.

.6 Terminology used in the various indexed sections of the books shall be consistent.

1.7 AS-BUILT DRAWINGS

.1 Maintain, as the work progresses, accurate records of changes to the work including deviations in runs of concealed services, conduits, pipes, ductwork and equipment location.

.2 Obtain two sets of white prints and record work constructed differently than shown on Contract Documents. Record all changes in the work and transfer to drawings, prior to submission to the Consultant.

.3 Record the following significant deviations:

.1 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface feature.

.2 Location of internal utilities and appurtenances which are concealed in construction, referenced to visible and accessible features of structure.

.3 Field changes of dimensions.

.4 Other significant deviations which are concealed in construction and cannot be identified by visual inspection.

.4 Mechanical and Electrical as-built drawings shall show the dimensioned location of all buried piping and valves. See Division 15 and 16 for additional requirements.

.5 Be responsible for the accuracy of changes, additions or deletions recorded on these drawings.

.6 Make records in a neat and legibly printed manner with a non-smudging medium.

.7 Identify each drawing as "As-Built Copy", maintain drawings in good condition, do not use them for construction purposes, and make available to Consultant at all times.

.8 Maintain As-Built drawings in a state current to project. Such state shall be considered a condition precedent for validation of applications for payment. The consultant's visual inspection shall constitute proof that As-Built drawings are current.

.9 Transfer As-Built drawing to electronic drawings in AutoCad format and submit as electronic disc and 2 sets of prints to Consultant for review before application for Substantial Performance of Work.

.10 Submit completed As-Built drawings to municipality, if requested.

.11 Submit to Owner two (2) complete sets of reviewed hard copy "As-Built" drawings, one (1) copy of electronic “As-Built” drawing disc, and two (2) complete sets of specifications and manuals.

2.0 PRODUCTS

Not Used

3.0 EXECUTION

Not Used

- END OF SECTION -

1.0 GENERAL

1.1 STANDARDS

.1 Except as otherwise indicated on the drawings or specified herein, the industry standards referred to in the specifications shall apply to all work under this Contract and all such standards shall refer only to the current editions of the industry standards, unless otherwise indicated. Where requirements indicated on the drawings or specified herein, differ from the industry standards, the more stringent requirements shall govern.

.2 Wherever in this specification it is specified that products and installation methods shall meet approval of jurisdictional authorities, Underwriters, Owner, Consultant or others, obtain such approval in writing.

.3 For abbreviations of standards issuing organization, refer to Section 01070.

.4 Where specifications list a standard, the product and workmanship as applicable, shall meet or exceed the specified requirements of that standard.

.5 Where specifications list a standard and a product is named, the quality level of the product, as tested to the standard, shall govern.

1.2 ACCESS TO THE WORK

.1 The Owner and the Consultant or their authorized agents or representatives shall at all times have access to the work whether on or off site. If parts of the work are in preparation at locations other than the place of work, the Owner, and the Consultant or their authorized agents or representatives shall be given access to such work wherever it is in progress.

.2 If the Contractor covers or permits to be covered, work that has been designated for special tests, inspections, reviews or approvals before such special tests, inspections, reviews or approvals are made, given or completed, he shall, if so directed, uncover such work, have the inspections or tests satisfactorily completed and make good such work at his own expense.

.3 Suspect Work

.1 The Consultant may order any part or parts of the work to be specially examined should he believe that such work is not in accordance with the requirements of the Contract Documents. If, upon examination such work is found not in accordance with the requirements of the Contract Documents, the Contractor shall correct such work and pay the costs of examination and correction. If such work is found in accordance with the requirements of the Contract Documents, the Owner shall pay the cost of examination and replacement.

.2 The Contractor shall furnish promptly to the Consultant, two copies of Certificates and Inspection Reports relating to the work.

1.3 WORKMANSHIP

.1 Execute work in accordance with the highest quality standards of the industry by skilled workers qualified in their respective trades, under the supervision of a competent foreman.

.2 Use, install and handle manufactured materials, equipment and appliances in accordance with manufacturer's directions and instructions.

1.4 PROVISIONS FOR INSPECTION AND TESTING

.1 Provide labour and facilities to:

.1 Provide access to work to be inspected and tested, including scaffolding and stage equipment if required.

.2 Facilitate inspections and tests.

.3 Make good work disturbed by inspection and test.

.4 Supply samples of all materials and assembly mock-ups as required for testing. Label and identify samples as required. Protect and properly orient approved samples in location convenient for comparison purposes. Provide adequate lighting for samples. Package or crate samples and deliver to a single location as directed.

.5 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.6 If test results fail to meet requirements of the Contract, arrange for retesting.

.7 Tests required by authorities having jurisdiction shall be arranged by the Contractor and witnessed by the Consultant.

.2 If work is designated for tests, inspections, review or approvals in the Contract Documents, or by the Consultant's instructions, or the laws or ordinances of the place of the work, the Contractor shall give the Consultant at least 24 hours (or as called for in the trade sections) notice requesting inspection. Inspection by the Consultant shall be made promptly. The Contractor shall arrange for inspections by other authorities and shall give the Consultant timely notice of the date and time.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 The contractor is responsible to arrange and co-ordinate the following inspection and testing, which will be disbursed under the specified Cash Allowances:

.1 Inspection, testing and certification of concrete.

.2 Inspection, testing and certification of compaction required.

.5 The Contractor shall not rely solely on this information relative to his own quality control measures, and it shall not relieve the Contractor from his responsibility under the Contract for the proper conduct of the work and for conducting whatever tests are necessary to be certain that the work is conducted in accordance with the Contract.

1.5 REJECTED WORK

.1 Defective work, whether the result of poor workmanship, use of defective materials or products, or damage through carelessness or other act or omission on the part of the Contractor and whether incorporated in the work or not, which has been rejected by the Consultant as failing to conform to the Contract Documents, shall be removed promptly from the place of the work by the Contractor and replaced or re-executed promptly in accordance with the Contract Documents at the Contractor's expense.

.2 Other work destroyed or damaged by such removals or replacements shall be made good promptly at the Contractor's expense.

.3 If, in the opinion of the Consultant, it is not expedient to correct defective work or work not performed in accordance with the Contract Documents, the Owner may deduct from the Contract Price the difference in value between the work as performed and that called for by the Contract Documents, the amount of which will be determined in the first instance by the Consultant.

.4 The Contractor will be held responsible for delays caused by rejected work.

1.6 MOCK-UP

.1 Where mock-up is specified, provide mock-up at location directed and repeat until approval has been obtained.

.2 Make mock-up representative of actual installation including workmanship, backing material, adjacent construction, finishes and colours.

.3 Unless noted otherwise, mock-ups may become part of the finished installation, on their being approved.

1.7 WARRANTIES REQUIRED UNDER THE CONTRACT

.1 Upon completion of all of the work and prior to the release of the retention monies to the Contractor, the Contractor shall provide the Owner with written warranties as called for in the trade sections and Section 01700. Where extended warranty is not called for, the Standard Contractor Warranty as per the General Conditions of the Contract shall apply.

.2 All warranties shall be dated to commence from the date of acceptance of the work having been totally completed by the Owner. See also Section 01700.

2.0 PRODUCTS

Not Used

3.0 EXECUTION

Not Used

- END OF SECTION -

1.0 TEMPORARY UTILITIES

1.1 POWER

.1 The Contractor will supply temporary power service to job site and in the building, suitable for all construction requirements and in accordance with governing regulations and ordinances.

.2 Extend temporary power for installation, testing and operation of equipment until permanent hook-up, or total completion date.

.3 Provide temporary power panels and temporary connections for portable electric tools and lighting. Run temporary wiring in a safe manner in accordance with local Electrical Code requirements.

.4 Remove temporary power equipment and wiring on completion of the work.

1.2 TEMPORARY LIGHTING

.1 Provide and maintain temporary wiring and lighting throughout the project as required for construction and safety purposes. Provide approved extension cords as required. Provide 860 lux minimum lighting level at surfaces for finishing trades.

.2 Operate permanent lighting system only if approved. Be responsible for care and maintenance of system during construction and hand it over to Owner in first-class operation condition, certified as new, upon completion. Clean fixtures and replace light bulbs before completion of the work if permanent lighting units are used.

1.3 TEMPORARY HEATING

.1 Provide and pay all costs for temporary heat, heating equipment, fuel, attendance and enclosures to protect the work, keep the work adequately warm and sheltered from the elements if required.

.2 Maintain the temperature of building and temporary enclosures at not less than 15C and at higher temperatures as may be necessary to provide a suitable environment for the work to be done without delay. Provide thermometers and record temperature inside and exterior to the building envelope each day.

.3 Keep temporary heating ready for operation from September 15th to May 15th.

.4 Use radiant heat or forced warm air type heaters. Operate in well ventilated location and vented to exterior. If used in areas of completed building, provide protection of floors and adjacent surfaces to prevent damage. Distribute heat uniformly to avoid hot or cold areas and avoid excessive drying.

.5 The permanent heating system may be used if approved by the Owner for temporary heating of the building when the building is permanently enclosed and the system has been inspected, tested, chemically treated and is complete with all safety equipment installed and operating properly. At the completion of the work, the equipment and system shall be thoroughly cleaned and all components serviced, worn and damaged components replaced so that all warranties on the equipment and system so used remain in force for a minimum of one year from date of issuance of the Final Statement of completion, unless specifically noted otherwise in the construction documents.

.6 The permanent heating system shall be used and properly maintained in accordance with operating procedures prescribed by the Consultant and all damage prior to official acceptance of the building shall be made good at no additional cost. The heating equipment and system shall be turned over to the Owner thoroughly cleaned and in perfect operating condition.

.7 Do not use air distribution system until permanent or temporary filters are in place. Filter air distribution system to prevent dust and dirt from entering units via return air. Replace or clean filters frequently during construction to minimize entry of dirt. Clean (if cleanable) or replace filters before turning system over to the Owner.

.8 Permanent building air conditioning system shall be connected and operational (during summer months) while work is in progress.

1.4 WATER SUPPLY

.1 The Contractor will provide temporary water source. Provide distribution as necessary for the work.

1.5 CONVENIENCES

.1 Supply, install and maintain in sanitary condition, an adequate number of portable, weatherproof, toilet conveniences of the chemical type. Regularly service for the use of all persons on the work. Provide conveniences to the approval of health authorities and keep padlocked during off hours. Post notices regarding the use of conveniences provided.

1.6 TELEPHONE

.1 Provide at least one telephone available for the use of all trades. Pay all charges for the service, toll and long distance charges to be paid for by those making the calls. Recovery of charges is the responsibility of the Contractor.

.2 Trades requiring telephone service shall provide same at their own expense.

1.7 TELECOPIER/FAX

.1 Install and maintain in the project office a telecopier/fax machine throughout the duration of construction to enable instant graphic communication between all parties to the Contract.

2.0 TEMPORARY CONTROLS

2.1 CLEANING, REMOVAL OF RUBBISH

.1 Maintain the work site in a clean, safe tidy condition, free from the accumulation of waste products and debris.

.2 Keep building and site free from accumulations of excess materials. Remove oily rags and waste from premises at close of each day, or more often if required.

.3 Upon attaining Substantial Performance of the Work, the Contractor shall remove his surplus products, tools, construction machinery and equipment not required for the performance of the remaining work.

.4 Provide refuse containers at convenient locations. Be responsible for cleaning up and removing rubbish into the refuse containers daily.

.5 Suitably prepare and vacuum clean areas and surfaces before finishing work commences. Take care to settle and minimize dust before flooring, painting and other finishing work begins. Use commercial type vacuum cleaners.

2.2 POLLUTION CONTROL (Provincial Law)

.1 Comply with the regulations of authorities having jurisdiction regarding environmental pollution.

.2 The Contractor shall not dispose of waste solvents, petroleum products, toxic chemicals or solutions in the municipal drainage system, dump or bury garbage on the construction site. This type of waste must be taken to an approved disposal facility. Dispose of all garbage regularly and in accordance with requirements of authorities having jurisdiction.

2.3 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

.3 Assume responsibility for damage incurred due to lack of or improper protection.

2.4 FIRES

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

3.0 TRAFFIC REGULATIONS

3.1 PERMITS

.1 Obtain, and if necessary, pay for permit for use and maintenance of local streets, including cleaning of streets (including deposit, if necessary).

3.2 TEMPORARY SERVICE ACCESS

.1 Confine construction traffic, work, parking, storage, etc., to the designated areas.

.2 Upon completion, restore areas to original condition, unless otherwise specified.

3.3 PARKING

.1 Parking to be determined at start of project and in designated areas only.

.2 Repair streets, drives, curbs, sidewalks, poles, etc., when damage has been caused by the performance of the work by the Contractor and leave them in as good a condition, after completion of the work, as before operation started.

.3 Do not block any streets, walks or drives nor allow their use for parking by any personnel or visitor. The Contractor shall at all times minimize all impediments to traffic movement and the temporary closing of streets.

4.0 FIELD OFFICES AND SHEDS

4.1 TEMPORARY OFFICE

.1 At commencement of work erect where directed by Owner, and maintain temporary office of

suitable size and quality to accommodate working space for Contractor's field personnel and job meetings.

.1 Equip office with suitable benches and table for examination of drawings.
.2 Make office artificially lighted, to minimum 80 foot candles at desk height.
.3 Heat office when necessary. (Minimum 20C during working hours).
.4 Keep office clean and orderly and make available for use of the Owner, his representative, and the Consultants.
.5 Do not use office for storage of materials.
.6 Move temporary office when directed and restore the site area to its original condition as required after final removal.

.2 Do not use the existing nor new buildings as an office unless approved by Owner and by prior arrangement.

4.2 STORAGE SHEDS

.1 In the designated work site area approved by Owner, erect as required, weather tight storage sheds, with floors raised above ground, for storage of materials, tools, equipment.

.2 Do not use the existing nor new buildings for storage of materials, unless approved by Owner.

.3 Move temporary storage sheds when directed and restore the site area to its original condition as required after final removal.

4.3 SITE HOARDINGS

.1 Maintain and pay municipal charges as required for site hoardings. Provide hoarding or fencing as may be required by local codes and requirements and to prevent injury.

5.0 CONSTRUCTION AIDS

5.1 SCAFFOLDING

.1 Erect scaffolding independent of finished surfaces. Use scaffolding in such a manner as to interfere as little as possible with other sections. When not in use, move scaffolding as necessary to permit installation of other work. Construct and maintain scaffolding in a rigid, secure and safe manner.

.2 Remove scissor lift and scaffolding promptly when no longer required.

5.2 HOISTING

.1 Supply, install and maintain conveying equipment such as cranes, hoists, etc., as required for the proper execution of the work. Comply with governing codes.

.2 Assume complete responsibility for construction, strength, placing, anchoring, and operation of such equipment to ensure that any load carried thereon can be safely supported.

.3 Make the use of accessory equipment and conveying systems available to trades as required.

.4 Promptly remove such equipment when no longer required.

- END OF SECTION -

1.0 SECURITY

1.1 PROTECTION OF WORK

.1 Protect the work and make good at no cost to the Owner, damage to the work until the building has been completed and accepted by the Owner.

.2 Make every temporary support as strong as permanent supports.

.3 Refer to Section 01500 Construction Facilities for additional protection requirements.

1.2 SECURITY

.1 Locking premises shall be as per established measures approved by security arrangements to be made with the Owner. Lock storage enclosures after working hours when work is not in progress. Fit doors with temporary lock and key. Close all openings securely.

1.3 WATCHMAN

.1 Employ competent persons for guarding work at all times outside of regular working hours (including nights, Sundays and holidays), until area is turned over to the Owner. In case of strike, or hoarding removal, provide watchman on 24-hour-a-day basis.

.2 Be responsible for costs, damages, loss and public liability claims resulting from failure to comply with above.

1.4 FLOOR FINISH PROTECTION

.1 Protect trowelled concrete subfloors and finished flooring from damage. Take special measures when moving heavy loads or equipment on them.

.2 Keep all surfaces dry and free from oil, grease and other foreign matter which may be detrimental to the finished work.

.3 After finished floor surfaces have been installed, prevent damage and staining by erecting barriers, signs, or provide supervision to ensure that there is no unnecessary traffic or operations performed over floors which could lead to damage.

.4 Where construction operations must be performed or traffic routed over floors during balance of construction period, lay 6 mm minimum plywood coverings over surface in such areas. Damage to finished floors shall be made good at no cost to the Owner. Do not use flammable paper for protective covering.

1.5 ROOF PROTECTION

.1 Do not permit construction traffic over completed roofing or unprotected waterproofing.

1.6 PLASTIC FOAM INSULATION

.1 Protect exposed plastic foam thermal insulation from heat and flame, especially adhesives which have not cured.

.2 Store plastic foam board stock in limited quantities in a location free from ignition hazard. Do not stack more than 2400 mm high. Provide adequate aisle space for access between stacks. Dispose of waste plastic foam daily.

2.0 WEATHER PROTECTION

2.1 ENCLOSURES

.1 Provide and set up in all openings, temporary enclosing partitions and doors to keep out the weather with fastenings inside only.

.2 Provide and install temporary weatherproof enclosures for parts of building as required for protection against elements and to maintain temperatures required and specified in respective sections. Design enclosures to withstand prevailing winds. Structural frame of building may be used, within limits of loads for which they are designed for support of temporary enclosures. Keep surfaces of temporary enclosures free of snow and ice to avoid any undue loads being transferred to structural frame.

2.2 LOW TEMPERATURE PROTECTION

.1 Provide adequate frost and low temperature protection, including heating, for work in progress, and finished work.

.2 Provide heat for materials affected by cold both in storage and during construction.

.3 Replace work or materials damaged by frost at no cost to the Owner.

2.3 DRAINAGE

.1 Protect building from damage by rainwater at exterior wall where new windows are to be installed into existing wall. Provide equipment, temporary drainage and enclosures required for this protection.

3.0 TEMPORARY FIRE PROTECTION

3.1 FIRE PROTECTION

.1 Provide and maintain in working order, suitable, ULC labelled, fire extinguishers and temporary standpipe systems, as the work progresses, locate to approval of insurance company and authorities having jurisdiction.

Coordinate sprinkler shutdowns in order to provide adequate life safety at all times.

.2 Remove temporary fire extinguishers upon completion of the work.

3.2 FLAMMABLE SOLVENTS

.1 Where products containing flammable solvents are being used, take the following precautions against fire:

.1 Ensure compliance with contract requirements and local laws concerning construction safety and fire prevention.

.2 Provide suitable fire extinguishing equipment in the work area.

.3 Post "No Smoking" and "Flammable Solvent" signs prominently in the area where materials are being applied. Leave these signs in place until coatings or adhesives containing flammable solvents are cured. No smoking is permitted in the store.

.4 Provide ventilation to prevent accumulation of solvent vapours.

.5 Do not permit welding in areas where materials containing flammable solvents are being applied.

.6 Do not operate spark producing electrical equipment, gas appliances or oil-burning equipment in areas where solvent vapours could be ignited.

4.0 BARRIERS, GUARD RAILS

.1 Provide hoardings, railings, barriers, covered walkways with lighting, as required for protection of the workers, as required by law and by authorities having jurisdiction. Erect railings around shafts, stairwells and around perimeter of floors not permanently enclosed. Equip the foregoing with warning lights and signs as required.

.2 Alter, remove and relocate or replace hoardings, barriers as required by authorities having jurisdiction.

- END OF SECTION -

1.0 PRODUCTS AND MATERIALS

1.1 Except where specifically mentioned, use Canadian manufactured materials to execute this Contract if the required quality is obtainable.

1.2 Materials, products and equipment are specifically described and named in the specifications to establish a standard of materials and workmanship.

.1 Manufactured materials and equipment which are specified by their proprietary names or by part or catalogue numbers shall be provided.

.2 Where a number of proprietary materials are specified for one use, the Contractor shall select one of the materials specified.

.3 No substitution for materials will be allowed unless written approval of alternative material or equipment has been obtained from the Consultant prior to signing the Contract.

.4 Changes to manufacturer's products without prior notification in sufficient time to evaluate the effects of such changes prior to tender closing date, will not be accepted.

.5 Where a manufacturer's standard product line does not fully meet specified requirements in every characteristic, it is intended that the manufacturer will upgrade his product to the required standard to qualify as a supplier or will refrain from bidding.

1.3 Products which are not specified shall be of a quality best suited to the purpose required and their use subject to the approval of the Consultant.

1.4 Defective material or products whenever found at any time prior to the final acceptance of the work will be rejected regardless of previous inspection. Inspection by the Consultant will not relieve the Contractor from responsibility, but it is a precaution against oversight or error.

2.0 MANUFACTURERS' INSTRUCTIONS

2.1 Apply, install, connect, erect, use, clean and condition all manufactured articles, materials and equipment in accordance with the manufacturer's written instructions unless otherwise specified.

2.2 File one copy of manufacturer's written instructions for products used in the work at the site office.

3.0 DELIVERY, HANDLING AND STORAGE OF MATERIALS

3.1 Deliver, store and handle materials to exclude foreign material, and to prevent soiling and increase of moisture content. Prevent damage to material, structure and finishes.

.1 Avoid excessive loading stresses in materials.

.2 Deliver packaged products, and store until used, in original unopened wrapping or containers, with manufacturer's seals and labels intact.

.1 Do not deliver plastic materials to site in advance of installation time, and avoid exposure of plastic materials to sunlight; complete installation and concealment as rapidly as possible to each area of work.

.3 Label packaged products to describe contents, quantity and other information as specified. Do not remove labels.

.4 Store materials which will be damaged by weather in suitable dry accommodation. Provide heat and ventilation as required to maintain temperatures at 15C minimum and as recommended by material manufacturer.

.1 Store highly combustible or volatile materials separately from other materials and under no circumstances within the building. Protect against open flame and other fire hazards. Limit volume of supply on the site to minimum required for one day's operation. Ventilate enclosure as required. Store as prescribed by authorities having jurisdiction.

.2 Do not store material and equipment detrimental to finished surfaces within areas of the building where finishing has commenced or has been completed.

.3 Handle and store materials in accordance with manufacturer's and supplier's recommendations. Remove and replace damaged materials.

.4 Store steel on racks or skids and covered to protect it from dirt, water, and damage. Maintain steel in its fabricated form.

.5 Store premixed cementitious materials, lime, sand and aggregate on platforms so as to avoid inclusion of foreign materials, and cover adequately with waterproof coverings.

.6 Deliver and store masonry units at the site on pallets, adequately cover with waterproof coverings.

.7 Provide flat, solid support for all sheet material during storage.

.8 Store paints and mix in a room assigned for this purpose. This room shall be kept under lock and key. Oily rags and any other combustible materials shall be removed every night. Every precaution shall be taken to prevent spontaneous combustion.

.5 Store and handle flammable liquids and other hazardous materials in approved safety containers and as otherwise prescribed by authorities having jurisdiction.

.6 Reject and remove damaged products and work from the premises immediately.

3.2 If necessary, schedule delivery of materials so that they may be installed directly in place. At all times minimize all impediments to traffic movement and the temporary closing of accesses and streets.

4.0 FASTENINGS

4.1 Supply all fastenings, anchors and accessories required for fabrication and installation of the work.

4.2 Attach and fasten work and components in place in safe, positive, permanent, secure manner so that they cannot work loose or fall or shift out of position as a result of vibration or other causes which may occur in the normal use of the building.

4.3 Metal fastenings shall be of the same material as the metal component they are anchoring or of a metal which will not set up an electrolytic action which would cause damage to the fastening or metal component under moist conditions.

4.4 Make exposed metal fastenings and accessories of the same texture, colour and finish as base metal on which they occur.

.1 Use stainless steel (Type 300) fasteners where exterior to the building's air barrier.

.2 Use EPDM washers where weather tightness is required.

4.5 Use cast-in-place inserts whenever possible for anchorage to concrete; where this is not possible, use approved self-drilling anchors recommended for the specific job conditions.

4.6 Do not exceed 25% of the safe working load stated by the manufacturer as average test loads for the anchor. Receive instruction from the anchor manufacturer regarding correct installation methods and tools, and comply with these requirements. The Consultant may at any time request the random load testing of anchors. Arrange and conduct these tests as requested without additional charge.

4.7 Provide anchors and fasteners required to secure items to the structure, strength and size of anchors and fasteners to suit substrate into which they are embedded and load imposed on them. Provide nuts, washers, non-slip washers and spacers as required.

.1 Select fastener heads to provide an inconspicuous appearance recessed where possible.

4.8 Conceal fastenings wherever possible. Keep exposed fastenings to a minimum, evenly spaced and laid out symmetrically.

4.9 Supply adequate instructions and templates and supervise installation where fastenings or accessories are required to be built into work of other trades.

4.10 Explosive actuated fastenings shall not be used on the work.

5.0 FIELD MEASUREMENT

5.1 Take field measurements prior to preparation of shop drawings and fabrication, allow for trimming and fitting where field measurements can not be taken.

6.0 SHOP ASSEMBLY

6.1 Preassemble and inspect in factory to ensure coordinated, well-fitted installation. Disassemble for shipping and handling after clearly marking units to permit coordinated assembly.

- END OF SECTION -

1.0 GENERAL

1.1 REFERENCE

.1 Arrange for, conduct and document take-over procedure, refer to General, Supplementary Conditions and Submittal.

1.2 FINAL CLEANING

.1 Upon completion of the work, and immediately prior to the final inspection, thoroughly clean all components of the building and premises where work has taken place and ensure is ready for continued occupancy.

.2 Use appropriate apparatus and cleaning materials. Clean in accordance with the manufacturer's and supplier's directions.

.3 Temporary protection and facilities shall be removed and defects in materials and workmanship, noted after the removal of such temporary protection, shall be made good.

.4 Areas shall be cleaned such that all dust, dirt, stains and other disfigurement shall be removed. Clean glass and hardware.

.5 Remove identification labels, dust, dirt, stains, smudges and other foreign matter detrimental to appearance or performance of finished surfaces, mechanical and electrical apparatus and equipment.

.6 Clean and polish surfaces of hardware, glass, mirrors, plastic laminate, baked enamel, glazed ceramic, stainless steel and non-ferrous metals that have been installed under this contract.

.7 Remove temporary protective coverings and coatings, temporary labels.

.8 Remove debris and dust from ducts and plenums, change filters.

.9 Clean, repair, lubricate and adjust all mechanism and movable parts of apparatus, appliances and equipment installed or modified during this contract, leaving it in new condition and operating properly.

.10 Cleaning of floors to be scheduled in accordance with specifications for initial cleaning, sealing, waxing and polishing.

.11 Upon completion of final cleaning, remove cleaning equipment materials and debris from the building and site.

1.3 INSPECTION AND DECLARATION FOR SUBSTANTIAL PERFORMANCE

.1 Contractor’s Inspection: Prior to application for Certificate of Substantial Performance of the Work, carefully inspect the work and ensure that it is complete, that major and minor construction deficiencies are complete and/or corrected and that the building is clean and in condition for occupancy. Notify the Consultant in writing of satisfactory completion of inspection and request a Consultant’s inspection.

.2 Consultant’s Inspection: The Consultants and the Contractor will perform an inspection of the Works. Deficiencies and defects identified by Consultants shall be rectified accordingly.

.3 Completion: Submit written certification that following have been performed:

a) Work has been completed and inspected for compliance with Contract Documents.

b) Defects have been corrected and deficiencies have been completed.
c) Equipment and systems have been tested, adjusted and balanced and are fully operational.
d) Certificates required by Fire Commissioner, Utility Companies have been submitted.
e) Operation of systems has been demonstrated to Owner's personnel.
f) Work is complete and ready for Final Inspection.

.4 Prior to Substantial Performance of the Work submit maintenance/operating manuals, necessary data and operation instructions, evidence of satisfactory results of all necessary tests, warranties, bonds, record and "as-built" drawings (Submittal Section 01300), service and maintenance contracts, spare parts and maintenance materials, receipts for salvage items, etc. and instruct Owner's personnel to start-up, tune, operate and maintain all equipment and systems installed. The following shall be 100% complete, to the satisfaction of the Owner, prior to Certificate of Substantial Performance being issued:

a) Maintenance/Operating Manuals.
b) All record and "as-built" drawings.
c) All keys for equipment and building as specified, including related keying information and keying charts.
d) All test reports for mechanical and electrical systems, as specified in Divisions 15 and 16.
e) Equipment and systems operating instructions and orientation for Owner's personnel, as specified in Section 01700 - Contract Closeout.
f) All spare parts and maintenance materials have been turned over to the Owner.
g) Written agreement on Service/Maintenance Contracts identified in project specifications.
h) Warranty and Bond Certificates.
i) Declaration from the Contractor in accordance with the Builders' Liens Act and Statutory Declarations.
j) Letter of Clearance from Workers Compensation Board.

.5 Final Inspection: When the items noted above are complete, request a final inspection of the Work by the Owner, Consultants and the Contractor. If Work is deemed incomplete by the Consultants, complete the outstanding items and request a re-inspection. Should status of work require re-inspection by Owner and Consultants due to failure of work to comply with Contractor's claims for inspection, Owner will deduct amount of Consultants' compensation for re-inspection services from payment to Contractor.

.6 Declaration of Substantial Performance: When the Consultant considers that all deficiencies have been corrected and that it appears that requirements of the Contract have been performed, make application for Certificate of Substantial Performance of the Work. Refer to General Conditions GC 5.4 - Substantial Performance of the Work.

.7 Commencement of Lien and Warranty Periods: The date of Substantial Performance as stated on the Certificate of Substantial Performance shall be the date for commencement for the warranty period and commencement of the lien period.

1.4 INSPECTION FOR TOTAL PERFORMANCE

.1 When the Contractor is satisfied that the entire work is complete, and after making his own inspection, he shall make a written request for a final inspection by the Consultant, who in turn shall notify the Owner. This inspection shall be carried out and completed within ten (10)

calendar days of the request, and shall constitute the inspection precedent to the issuance of the Final Certificate for Payment.

.2 The final inspection team shall include:

a) The Consultant and other Consultants as he may require.
b) The Contractor and any Subcontractors deemed necessary by the Contractor.
c) The Owner, represented by designated members of the Winnipeg Transit.

.3 If there are any defects or deficiencies determined by this inspection, they shall be listed by the Consultants. The Contractor shall complete the outstanding items and request a re-inspection by Consultant following his own inspection to take place within seven (7) calendar days from date of request.

.4 Should status of work require re-inspection by Consultant due to failure of work to comply with Contractor's claims for inspection, Owner will deduct amount of compensation for re-inspection services from payment to Contractor.

.5 The Contractor shall thereafter submit his invoice for Final Payment.

1.5 EQUIPMENT DEMONSTRATION

.1 Arrange and include all costs necessary for the demonstration to the Owner's operational and maintenance staff of all mechanical, electrical and electronic equipment in the Contract.

.2 Arrange demonstrations at a time convenient to Austin Credit Union and as soon as possible after acceptance of the work at Substantial Performance.

.3 Refer to Divisions 15 and 16 for detailed procedures of Mechanical and Electrical sections and trial usage.

1.6 COMMISSIONING

.1 The Owner will commission structural, architectural as well as mechanical and electrical systems and equipment after Substantial Performance.

.2 Repair any defects or deficiencies found during commissioning process.

.3 If Contractor fails to correct defects or deficiencies within a reasonable time agreeable to the Owner and Contractor, the Owner will complete the work and charge the Contractor for all costs incurred.

1.7 WARRANTIES

.1 The following list of required warranty periods is for convenience only and is not necessarily complete.

Section	Item	Warranty Period in Years
07900	Sealants	2 yrs
07900	Sealants (Dow Silicone only)	20 yrs
08100	Glass & Glazing of Screens	2 yrs
08400	Windows	5 yrs
09650	Resilient Flooring	5 yrs
10800	Mirrors	10 yrs

Division 15 and 16 - as noted in specifications.

.2 Submit warranties for all items noted in the Contract Documents including those of Subcontractors, prior to application for final payment.

.3 Warranties shall be in a form acceptable to the Consultant and the Owner.

.4 Notwithstanding the provisions of this article, if any statute in force in the province where the work is being performed creates a more extended liability for faulty materials or workmanship, then the provisions of such statute shall apply. Warranties shall not be deemed to restrict any liability of the Contractor arising out of an applicable law.

.5 Warranties shall include the prompt remedy of defects upon written notification from the Owner that the defects exist. Remedy shall include labour, materials, equipment and services required to make good defective areas of the work in the case of factory fabricated components, to supply and install new components. Failure to do so will make Contractor financially responsible to Owner for repairs (material and labour) by qualified personnel. Emergency or other repairs by qualified personnel under the direction of Owner shall not nullify the warranty.

.6 Warranties shall commence at date of Substantial Performance of the work unless mutually agreed between Owner and Contractor, or unless specified otherwise for certain specific items.

.7 The Contractor shall provide at exactly 11 months after the date of Total Performance, a year end warranty inspection to be held with the Owner, the Consultants and the Contractor present. Contractor shall promptly remedy defects due to faulty materials or workmanship of the Work of Contract. Contractor shall remedy defects (s) within time period agreed to between Owner and Contractor. Failure to do so will make Contractor financially responsible to Owner for repairs (material and labour) by qualified personnel. Emergency or other repairs by qualified personnel under the direction of Owner shall not nullify the warranty.

2.0 PRODUCTS

Not Used

3.0 EXECUTION

Not Used

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED WORK SPECIFIED ELSEWHERE

.1 Cast-in-place Concrete Section 03300

.2 Division 15

.3 Division 16

1.3 DEFINITIONS

.1 "Earth Excavation" shall include removal of quicksand, sand, clay, loam, earth, hard pan, boulder clay, old macadam, bituminous, or gravel roadway surface, together with removal of old timber, stone filled or stone abutments and piers (except where otherwise specifically provided), boulders, old concrete and stone masonry under 28 cu.ft. (1 cu.m) volume, and solid rock in place which can be broken and removed by state-of-the-art, heavy duty mechanical excavating equipment.

.2 "Rock Excavation" shall include old concrete, stone, masonry or boulders equal or greater than 28 cu.ft. (1 cu.m) in volume, and solid rock in place which cannot be broken and removed by state-of-the-art, heavy duty mechanical excavating equipment.

1.4 REGULATIONS

.1 Shore and brace excavations, protect slopes and banks and perform all work in accordance with Provincial and Municipal regulations whichever is more stringent.

.2 Comply with Explosives Act of Canada R.S., c.E15, s.1. Perform blasting in accordance with Provincial and Municipal regulations. Repair damage to approval of Engineer / Architect. No blasting will be permitted within 3 m of any building and where damage would result.

1.5 BURIED SERVICES

.1 Before commencing work verify the location of all buried services on and adjacent to the site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations. Cap cutoffs.

1.6 PROTECTION

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Engineer/Architect’s Consultants approval.

.4 Protect natural and manmade features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

1.1 SUBMITTALS

.1 Conform to Section 01330.

.2 Submit samples of imported fill materials to the inspection and testing company as and when requested. Materials tested and approved shall constitute a standard for the acceptance of material delivered to site.

.3 Submit for approval 2'-0" (600mm) long x full width sample of filter fabric.

2.0 PRODUCTS

2.1 MATERIALS

.1 Sand: to CAN3-A23.1-M77, for fine aggregate.

.2 "A" Base:

Metric Sieve Size	% Passing
25 000	100
20 000	80 - 100
5 000	40 - 70
2 000	25 - 55
315	13 - 30
80	5 - 15

.3 "C" Base:

Metric Sieve Size	% Passing
25 000	100
20 000	
5 000	25 - 80
2 500	
315	
80	5 - 18

.4 Imported Fill: containing no organic or foreign matter and which is proven compactable to density of 95% Standard Proctor. Check silt content of imported fill.

.5 Drainage Tile: Where applicable, 4" (100mm) diameter plastic drainage tile, to CGSB 41-GP-29Ma, perforated.

.6 Filter Fabric: Where applicable, "270-R" by:

- Terrafix Geosynthetics Inc.
  425 Attwell Drive
  Rexdale, Ontario M9W 5C4
  Tel: (416) 674-0363
  or approved equal.

3.0 EXECUTION

3.1 PREPARATION

.1 Carefully examine drawings and the site, including access to the site. Establish the extent and nature of the materials which may be necessary to be removed and the amount of fill (including imported fill) to provide the required grades.

.2 Maintain all stakes for lines and levels.

3.2 EXCAVATION AND BACKFILL

.1 Excavate to lines and levels indicated on the drawings.

.2 Where possible, keep excavations sufficiently wide and deep to permit erection, inspection and removal of formwork and not less than 18" (460mm) clear of the construction.

.3 Prior to commencement, ensure location and protection of services.

.4 Excavate as required for the installation of paving and sub-base.

.5 Where acceptable to soils engineer, place and compact under slab fills directly over existing asphalt or concrete paving if applicable.

.6 Excavation and backfilling for trenches and all excavation for pipe and service lines shall be carried out to the requirements of Divisions 15 and 16 and under the direction of the respective trades installing such services. Work for Divisions 15 and 16 shall be taken to five feet outside the exterior building wall. Pipe and service lines include, without being limited to: electricity, telephone, gas and plumbing services. Slope earth adjacent to foundations or trenches at an incline not exceeding the recommendations of the Soils Report.

.7 Remove, cap or divert any existing or unused services, piping, drains, to the approval of local municipal authorities having jurisdiction.

.8 Engage a contractor licensed in the province to remove and dispose of any existing underground oil tanks and associated contaminated soil.

.9 Remove unacceptable material from the site.

.10 Unauthorized Excavation

.1 For excavation to greater depths than shown or authorized at foundations, backfilling will not be accepted. Structural work shall be extended at no additional cost to the Owner.

.2 Over-excavation of areas scheduled to receive floor slabs, walks and paving shall be brought to correct elevation with compacted granular fill of the type and level of consolidation determined by the Consultant. Extra work resulting from unauthorized excavation shall be executed without additional cost to the Owner.

.11 Extra Depths

.1 At unsatisfactory bearing levels, extend excavation to levels authorized by the Consultant in writing.

.12 Water in Excavation

.1 Keep excavations for footings dry. Remove soil affected by free water and replace with concrete at no additional cost.

.2 Generally keep excavations free of water.

.3 When required supply, install and maintain in efficient operation all pumping equipment, piping and hoses.

.4 Dewater the perched water table as excavation proceeds as required.

.13 Backfilling and Compaction

.1 Prior to installation of backfill, the entire sub-grade area shall be proof rolled using approved equipment. Make two passes in one direction and two passes perpendicular to the other. Cut out all soft spots, rutted or displaced areas; fill and re-compact.

.2 Do not backfill over frozen ground, organic matter or debris. Do not place backfill until the sub-grade, footings, foundation walls and drainage channels have been inspected and approved. Do not backfill at ambient temperatures, below 0° C, without approval of the Consultant.

.3 Remove soft spots and unstable material and refill with backfill material.

.4 Maximum lift thickness of compacted layers; “A" Base: 6" (150mm); “C" Base: 6" (150mm).

.5 Do not commence backfilling until Consultant's approval is given. Backfill with 'C' Base material and compact to 95% Standard Proctor Density maximum. Coordinate backfilling with the placement of drainage piping. After backfilling is complete, scarify surface to a uniform depth sufficient to eliminate all depressions and irregularities.

.6 Do not compact closer than 7'-0" (2 m) from wall with heavy equipment, use hand controlled light compaction equipment.

.7 Fill and Base to Slabs on Grade: bring sub-base to required elevation as specified above using 'C' Base material at 6" (150mm) deep lifts and compact each lift to 95% Standard Proctor Density. Install base of 6" (150mm) of 'A' Base material, and proof roll to 98% Standard Proctor Density.

.8 Fill Beneath Asphaltic Concrete Paving: after removal of all soil with organic content, the black silty clay and clay mixed with gravel fill should than be compacted by a sheepsfoot roller until the clay has a minimum density of 95% standard proctor density. Bring sub-grade to required elevation using 'C' Base material or suitable on-site material as directed by Soil Engineer at 6" deep lifts and compact each lift to minimum 95% Standard Proctor Density. Install minimum 6" (150mm) deep lift of "A" Base material. Grade and compact each lift layer of base ("A" Base gravel) to minimum density of 100% standard proctor density.

.9 Use vibratory equipment in proximity of foundations. Make good any damage due to settlement and at no cost to the Owner. Complete backfilling to correct elevations.

.14 Rough Grading

.1 Rough grade to levels, profiles and contours required, allowing for surface treatment indicated on the drawings.

.2 Slope grade away from building 1:50 (2%) minimum.

.3 Grade ditches to depths indicated on drawings and to provide positive runoff to drainage inlets without causing ponding.

.4 Uniform slopes shall be constructed between points for which finished grades and contours are indicated. Existing grades shall be met and blended in, in a smooth manner.

.5 Establish and maintain sub-grade parallel to the proposed finished grade and shape to allow adequate surface runoff, prevent ponding, scouring and erosion. If necessary, provide temporary relief, or diversionary swales and ditches at no extra cost.

.6 Do not carry out rough grading when soil is frozen or wet.

.7 In all areas where fill is to be placed on existing grade, scarify the surface to a minimum depth of 3" (75mm) in order to provide a good bond and prevent slipping of fill or topsoil.

.8 Do final cleaning upon completion of this work and be responsible for cleaning of mud tracking during construction.

3.3 FIELD QUALITY CONTROL

.1 In accordance with Section 01020 and 01400, engage the services of an inspection and testing company to carry out the following testing and reporting:

.1 Verification that earth bearings for foundations will sustain design loads.

.2 Verification that sub-grade exposed by removal of existing soil is capable of supporting fill, floor slabs and pavements.

.3 Sampling of fill materials intended for use to determine:

a) Natural moisture content.

b) Optimum moisture and density.

c) Amount of moisture to be deleted from or added to fill.

d) Ensure correct moisture content for compaction and maximum density.

.4 Verification that sub-grade has been compacted to specified density.

.5 Verification that fill has been placed and compacted as specified and to specified compaction density.

.2 The agency shall report all test and inspection results to the consultant and the contractor immediately after they are performed.

.3 Co-operate fully and arrange for Inspection Company to be on site well in advance of time needed.

- END OF SECTION -

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Methods and procedures for demolition of structures, parts of structures, basements and foundation walls and includes abandonment and removal of septic tanks.

1.2 RELATED SECTIONS

.1	Summary of Work	Section 01110
.2	Project Management and Coordination	Section 01310
.3	Regulatory Requirements	Section 01060
.4	Construction Facilities	Section 01500

1.3 REFERENCES

.1 Canadian Standards Association (CSA).

.1 CSA S350, Code of Practice for Safety in Demolition of Structures

1.4 QUALITY ASSURANCE

.1 Prior to start of Work arrange for site visit with Owner's Representative to examine existing site conditions adjacent to demolition work

.2 Hold project meetings every month.

.3 Ensure key personnel, site supervisor, project manager, subcontractor representatives, attend.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with 3.4 below and utilize alternate disposal method where possible.

.2 Remove from site all demolition waste and debris, following all government regulations and City ordinances.

1.6 EXISTING CONDITIONS

.1 Should material resembling spray or trowel applied asbestos or any other designated substance be encountered in course of demolition, stop work, take preventative measures, and notify Owner's Representative immediately. Do not proceed until written instructions have been received.

.2 Structures to be demolished to be based on their condition on date that tender is accepted.

.3 Salvage items as identified by Owner's Representative. Remove, protect and store salvaged items as directed by Owner's Representative. Deliver to Owner as directed.

1.7 DEMOLITION DRAWINGS

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

.2 Submit drawings stamped and signed by qualified professional engineer licensed in Province of Manitoba.

1.8 ENVIRONMENTAL PROTECTION

.1 Ensure work is done in accordance with Provincial Environmental Regulations.

.2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain.

.3 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered cease operations and notify Owner's Representative.

.4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

.5 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.6 Fires and burning of waste or materials is not permitted on site.

.7 Do not bury waste or materials on site.

.8 Do not dispose of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

.9 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.10 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities' requirements.

.11 Protect trees, plants and foliage on site and adjacent properties where indicated.

.12 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.13 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.9 SCHEDULING

.1 Ensure project time lines are met without compromising specified minimum rates of material diversion. Notify Owner's Representative in writing of delays.

2.0 PRODUCTS (Not applicable)

3.0 EXECUTION

3.1 PREPARATION

.1 Do work in accordance with Provincial Health and Safety Regulations.

.2 Disconnect electrical and telephone service lines entering buildings to be demolished. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.

.3 Disconnect and cap designated mechanical services.

.1 Sewer and water lines: remove to property line if being abandoned, or as directed by owner / consultant to location for reconnection.

.2 Other underground services: remove and dispose of as directed by Owner's Representative.

.4 Do not disrupt active or energized utilities designated to remain undisturbed.

.5 Remove rodent and vermin as required by Owner's Representative.

3.2 SAFETY CODE

.1 Do demolition work in accordance with Canadian Construction Safety Code and all Provincial regulations.

.2 Blasting operations not permitted during demolition.

3.3 DEMOLITION

.1 Demolish foundation walls to minimum of 300mm below finished grade.

.2 Demolish foundation walls and footings, and concrete floors below or on grade.

.3 Break 100mm holes per 10m² area in concrete slabs which are not to be removed, to prevent accumulation of water. Keep floor drains open if permanent drainage still connected.

.4 Pieces of concrete and masonry not larger that 200 mm broken from demolition work may be used as backfill in open basements on excavations provided voids are filled. Keep demolition fill 300 mm below finished grade level. Do not backfill basement areas until inspected by Owner's Representative.

.5 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

.6 At end of each day's work, leave Work in safe and stable condition. Protect interiors of parts not to be demolished from exterior elements at all times.

.7 Demolish to minimize dusting. Keep materials wetted as directed by Owner's Representative.

.8 Remove structural framing.

.9 Contain all fibrous materials (e.g. Insulation) to minimize release of airborne fiber while being transported to waste disposal site or alternative disposal location.

.10 Only dispose of material specified by selected alternative disposal option as directed by Owner's Representative.

.11 Ensure that these materials will not be disposed of in landfill or waste stream destined for landfill.

.12 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.13 Environmental:

.1 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimized danger at site or during disposal.

.2 Septic Tanks:

.1 Pump out buried septic tanks, left in place. Fill with sand.

.2 Remove tanks within area of new construction or under paved areas and slabs.

.14 Prior to the start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction, from site and dispose of at designated disposal facilities.

.15 Prior to the start of any demolition work remove underground storage tanks and piping as directed.

.16 Use natural lighting to work by wherever possible. Shut off all lighting except those required for security purposes at the end of each day.

3.4 STOCKPILING

.1 Stockpile materials in a location as directed by Owner's Representative.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Separate from general waste stream each of the following materials. Stockpile materials in neat and orderly fashion in location and as directed by Owner's Representative for alternate disposal where possible. Stockpile materials in accordance with applicable fire regulations.

.1 Glass fiber ceiling tiles.
.2 Wood fiber ceiling tiles.
.3 Power source poles deemed unfit for reuse by Owner's Representative.
.4 Wiring and conduit.
.5 Outlets/Switches
.6 Floor receptacles.
.7 Metal duct work, baffles, HVAC equipment.
.8 Demountable partitions.
.9 Drapes.
.10 Tracks and blinds.
.11 Insulation batts.
.12 Miscellaneous metals.
.13 Carpet.

.4 Supply separate, clearly-marked disposal bins for all categories of waste material. Do not remove bins from site until inspected and approved by Owner's Representative.

.5 Provide collection areas for collection of miscellaneous metals in the area of demolition.

3.5 REMOVAL FROM SITE

.1 Notify Owner's Representative in writing of any materials identified as not suitable for alternate disposal. Provide reasons prior to approval for disposal.

.2 Dispose of materials as directed by Owner's Representative.

.3 Remove stockpiled material as directed by Owner's Representative when it interferes with operations of project construction.

.4 Remove stockpiles of like materials by an alternate disposal option once collection of materials is complete.

.5 Transport material designated for alternate disposal in accordance with applicable regulations.

.6 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 REPORTING

.1 Record off-site removal of debris and materials and provide following information regarding removed materials to Owner's Representative within 24 hours.

.1 Time and date of Removal

.2 Description of Material

.3 Weight and Quantity of Materials.

.4 Breakdown of reuse, recycling and landfill quantities.

.5 End Demolition of Materials.

3.7 COORDINATION

.1 Coordinate alternative disposal activities with Owner's Representative's on site waste diversion representative.

- END OF SECTION -

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Formwork for cast-in place concrete, with shoring, bracing and anchorage.

.2 Openings for other work.

.3 Form accessories.

.4 Form stripping.

1.2 RELATED SECTIONS

.1	Concrete Reinforcement.	Section 03200
.2	Cast-in-Place Concrete: Supply of concrete accessories for placement by this section.	Section 03300
.3	Supply of mechanical items for placement by this section.	Division 15
.4	Supply of electrical items for placement by this section.	Division 16

1.3 REFERENCES

.1 ACI 301 - Structural Concrete.

.2 ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

.3 ACI 347 - Guide to Formwork for Concrete.

.4 ASME A17.10 - Safety Code for Elevators and Escalators.

.5 CAN/CSA-A23.1 - Concrete Materials and Methods of Concrete Construction.

.6 CAN/CSA-O86.1 - Engineering Design in Wood (Limit States Design).

.7 CSA O151 - Canadian Softwood Plywood.

.8 CAN/CSA O188.0 - Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.

.9 CSA O437 Series - Standards on OSB and Waferboard.

.10 CSA S269.1 - Falsework for Construction Purposes.

.11 CAN/CSA-S269.3 - Concrete Formwork.

.12 COFI (Council of Forest Industries of British Columbia) - Exterior Plywood for Concrete Formwork.

.13 PS 1 - Construction and Industrial Plywood.

1.4 DESIGN REQUIREMENTS

.1 Design, engineer and construct formwork, shoring and bracing to conform to code requirements; resultant concrete to conform to required shape, line and dimension.

.2 Conform to CSA S269.1.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with CAN/CSA-O86.1, ACI 347 standards.

2.0 PRODUCTS

2.1 WOOD FORM MATERIALS

.1 Form Materials: At the discretion of the Contractor.

2.2 FORMWORK ACCESSORIES

.1 Form Ties: At the discretion of the Contractor

.2 Form Release Agent:

.1 Colourless mineral oil which will not stain concrete, or absorb moisture.

.2 Non-toxic, biodegradable, low VOC.

.3 Form Stripping Agent: Colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110s Saybolt Universal 15 to 24 mm^2/s at 40ºC, flashpoint minimum 150ºC, open cup.

3.0 EXECUTION

3.1 EXAMINATION

.1 Verify lines, levels and centres before proceeding with formwork.

.2 Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

.1 Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION - FORMWORK

.1 Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

.2 Fabricate and erect false work in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.

.3 Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

.4 Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

.5 Align joints and make watertight. Keep form joints to a minimum.

.6 Obtain approval before framing openings in structural members which are not indicated on Drawings.

.7 If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Consultant.

3.4 APPLICATION - FORM RELEASE AGENT

.1 Apply form release agent on formwork in accordance with manufacturer's recommendations.

.2 Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

.3 Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

.1 Provide formed openings where required for items to be embedded in passing through concrete work.

.2 Locate and set in place items which will be cast directly into concrete.

.3 Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

3.6 FORM CLEANING

.1 Clean forms as erection proceeds, to remove foreign matter within forms.

.2 Clean formed cavities of debris prior to placing concrete.

.3 Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

.4 During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

.1 Construct formwork to maintain tolerances required by ACI 301.

.2 Construct and align formwork for elevator hoistway in accordance with CSA B44.

.3 Camber slabs and beams <2 mm/m in accordance with ACI 301.

3.8 FORM REMOVAL

.1 Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

.2 Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

.3 Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

- END OF SECTION -

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.2 RELATED SECTIONS

.1 Concrete Forms. Section 03100

.2 Cast-in-Place Concrete. Section 03300

1.3 REFERENCES

.1 CAN/CSA-A23.1 - Concrete Materials and Methods of Concrete Construction.

.2 CAN3-A23.3 - Design of Concrete Structures.

.3 CSA G30.3 - Cold-Drawn Steel Wire for Concrete Reinforcement.

.4 CSA G30.5 - Welded Steel Wire Fabric for Concrete Reinforcement.

.5 CSA G30.14 - Deformed Steel Wire for Concrete Reinforcement.

.6 CSA G30.15 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

.7 CAN/CSA-G30.18 - Billet-Steel Bars for Concrete Reinforcement.

.8 CAN/CSA-G40.21 - Structural Quality Steels.

.9 CAN/CSA-G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.

.10 CSA W186 - Welding of Reinforcing Bars in Reinforced Concrete Construction.

.11 RSIC (Reinforcing Steel Institute of Canada) - Reinforcing Steel Manual of Standard Practice.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01300: Procedures for submittals.

.2 Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules.

.3 Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

.4 Detail lap lengths and bar development lengths to CAN3-A23.3.

1.5 QUALITY ASSURANCE

.1 Design reinforcement under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the Province of Manitoba.

.2 Reinforcing steel supplier shall confer with contractor as to desired construction joint locations and supply dowels and bar lengths to accommodate these joints.

.3 Welders' Certificates: Submit to Section 01400, Manufacturer's Certificates, certifying welders employed on the Work, verifying CSA qualification within the previous 12 months.

2.0 PRODUCTS

2.1 REINFORCEMENT

.1 Reinforcing Steel: CAN/CSA-G30.18, new billet steel, Grade 400, deformed bars, unfinished.

.2 Stirrup Steel: ASTM A82, unfinished.

2.2 ACCESSORIES

.1 Tie Wire: Minimum 16 gauge annealed type.

.2 Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.

2.3 FABRICATION

.1 Fabricate concrete reinforcing in accordance with:

.1 CAN/CSA-A23.1.

.2 RSIC - Reinforcing Steel Manual of Standard Practice.

.2 Locate reinforcing splices not indicated on drawings, at point of minimum stress.

.3 In concrete beams, bend horizontal reinforcing 24” around corners, or use extra corner bars 36” x 36”.

.4 Top steel in beams shall be lapped at center span; bottom steel shall be lapped at support.

3.0 EXECUTION

3.1 PLACEMENT

.1 Place, support and secure reinforcement against displacement. Do not deviate from required position to CAN/CSA A23.1.

.2 Do not displace or damage vapour barrier.

.3 All reinforcing steel shall be cleaned of all dirt, grease and other deleterious materials prior to placing.

.4 Accommodate placement of formed openings.

.5 Maintain concrete cover around reinforcing as follows:

.1 Walls (exposed to weather or backfill) 50 mm

.2 Footings and Concrete Formed Against Earth 75 mm

.3 Slabs on Fill 20 mm

3.2 FIELD QUALITY CONTROL

.1 Quality Control - Field inspection. Section 01400

.2 Contact Design Engineer for steel reinforcement inspection minimum 2 working days prior to concrete placement; allow time for adjustments prior to scheduled concrete pour.

END OF SECTION

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Floors and slabs on grade.

1.2 RELATED SECTIONS

.1	Concrete Forms.	Section 03100
.2	Concrete Reinforcement.	Section 03200
.3	Concrete Curing.	Section 03390
.4	Mechanical items for casting into concrete.	Division 15
.5	Electrical items for casting into concrete.	Division 16

1.3 REFERENCES

.1 ACI 301 - Structural Concrete.

.2 ACI 302 - Guide for Concrete Floor and Slab Construction.

.3 ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete

.4 ACI 305R-10, Guide to Hot Weather Concreting.

.5 ACI 306R-10, Guide to Cold Weather Concreting

.6 CAN/CSA A5 - Cementitious Materials Compendium.

.7 CAN/CSA A23.1 - Concrete Materials and Methods of Concrete Construction.

.8 CAN/CSA A23.2 - Methods of Test for Concrete.

.9 CAN/CSA A23.5 - Cementitious Materials Compendium.

.10 CAN/CSA A363 - Cementitious Materials Compendium.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01330: Procedures for submittals.

.2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with ACI 301.

.2 Acquire cement and aggregate from same source for all work.

.3 Conform to ACI 305R when concreting during hot weather.

.4 Conform to ACI 306R when concreting during cold weather.

2.0 PRODUCTS

2.1 CONCRETE MATERIALS

.1 Portland Cement: CAN/CSA-A5.

.2 Fine and Coarse Aggregates: CAN/CSA-A23.1.

.3 Water: CAN/CSA-A23.1, clean and not detrimental to concrete.

2.2 ACCESSORIES

.1 Shrinkage Compensating Grout: Premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.

.1 Compressive strength: 50 MPa at 28 days.

.2 Consistency:

a) Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30 s.

b) Flowable: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portion) 125 to 145%.

c) Plastic: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portions) 100 to 125 %.

d) Dry pack to manufacturer's requirements.

.2 Non-Premixed Dry Pack Grout: Composition of non metallic aggregate, Portland cement with sufficient water for mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 50 MPa when measured at 28 days.

.3 Vapour Retarder: 6 mil thick clear polyethylene film, type recommended for below grade application.

.4 Where void form is indicated on drawings, use cardboard shear-mat below structural slabs and low density polystyrene below walls and grade beams.

2.3 CONCRETE MIX

.1 Mix and deliver concrete in accordance with CAN/CSA-A23.1-09, Table 5, Alternative 1.

.2 Provide concrete to the following compressive strengths and exposure classifications as defined in CAN/CSA-A23.1-09, Table 1:

.1 Slab: 32 MPa at 56 days, F-2 exposure class

.2 All other concrete: 32 MPa at 28 days, F-1 exposure class

.3 The use of calcium chloride is not permitted.

3.0 EXECUTION

3.1 EXAMINATION

.1 Verify site conditions to Section 01700.

.2 Verify requirements for concrete cover over reinforcement.

.3 Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

.1 Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

.2 In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

.3 Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.3 PLACING CONCRETE

.1 Place concrete in accordance with CAN/CSA-A23.1.

.2 Notify Consultant minimum 24 hours prior to commencement of operations.

3.4 CONCRETE FINISHING

.1 Steel trowel surfaces which are scheduled to be exposed.

.2 In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

.3 Saw cuts for slab on grade shall be 25 mm deep & 3 mm wide. Cutting to be done not sooner than 12 hours, and not later than 24 hours after the slab is poured. Cuts to be filled with approved bituminous compound or caulking.

3.5 CURING AND PROTECTION

.1 Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

.2 Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

.3 Cure concrete floor surfaces to requirements of Section 03390.

3.6 FIELD QUALITY CONTROL

.1 Section 01400 - Quality Requirement: Field testing.

.2 Provide free access to Work and cooperate with appointed firm.

.3 Three concrete test cylinders will be taken for every 50 or less cu m of each class of concrete placed.

.4 One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

.5 One slump test will be taken for each set of test cylinders taken.

3.7 PATCHING

.1 Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Consultant upon discovery.

.2 Patch imperfections in accordance with ACI 301.

3.8 DEFECTIVE CONCRETE

.1 Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Consultant.

.3 Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Consultant for each individual area.

- END OF SECTION -

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Initial and final curing of horizontal and vertical concrete surfaces.

1.2 RELATED SECTIONS

.1 Cast-In-Place Concrete. Section 03300

1.3 REFERENCES

.1 ACI 301 - Structural Concrete.

.2 ACI 302 - Recommended Practice for Concrete Floor and Slab Construction.

.3 ACI 308 - Guide to Curing Concrete.

.4 ASTM C171 - Sheet Materials for Curing Concrete.

1.4 SUBMITTALS

.1 Submit to Section 01330.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with ACI 301.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver curing materials in manufacturer's packaging including application instructions.

2.0 PRODUCTS

2.1 MATERIALS

.1 Membrane Curing Compound: ASTM C309 Type 1 Class A acrylic

.2 Water: Potable, not detrimental to concrete.

3.0 EXECUTION

3.1 EXAMINATION

.1 Verify substrate conditions to Section 01300.

.2 Verify that substrate surfaces are ready to be cured.

3.2 EXECUTION - HORIZONTAL SURFACES

.1 Cure floor surfaces in accordance with A23.1-09, exposure class S-2

3.3 PROTECTION OF FINISHED WORK

.1 Do not permit traffic over unprotected floor surface.

END OF SECTION

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Structural wall and roof framing.

.2 Built-up structural beams and columns.

.3 Wall and roof sheathing.

.4 Sill gaskets.

.5 Preservative treatment of wood.

.6 Miscellaneous framing and sheathing.

.7 Telephone and electrical panel back boards.

.8 Concealed wood blocking for support of wall cabinets, accessories and fitments.

1.2 REFERENCES

.1 CSA O86-09, Engineering Design in Wood

.2 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.

.3 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 CSA O80 Series-08, Wood Preservation.

.5 CSA O121-M1978 (R2003), Douglas Fir Plywood.

.6 CAN/CSA-O141-05, Softwood Lumber.

.7 CSA O151-04, Canadian Softwood Plywood.

.8 CAN/CSA-O325-07, Construction Sheathing.

.9 National Lumber Grades Authority Standard Grading Rules for Canadian Lumber 2005

1.3 SUBMITTALS FOR REVIEW

.1 Section 01330: Submission procedures.

.2 Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

.3 Shop Drawings For Site Fabricated Truss Frame: Indicate dimensions, wood species and grades, component profiles, drilled holes, fasteners, connectors, erection details and sequence.

1.4 QUALITY ASSURANCE

.1 Perform Work in accordance with the following agencies:

.1 Lumber Grading Agency: Certified by NLGA.

.2 Plywood Grading Agency: Certified by CAN/CSA-O325-07.

2.0 PRODUCTS

2.1 LUMBER MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, kiln-dried to moisture content of 19% or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Wall studs and built up columns to be minimum #2 SPF or better unless noted otherwise on drawings.

.3 Joists, lintels and built up beams to be minimum #2 SPF or better unless noted otherwise on drawings.

.4 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing and sleepers:

.1 Board sizes: "Standard" or better grade.

.2 Dimension sizes: "Standard" light framing or better grade.

2.2 SHEATHING MATERIALS

.1 Douglas fir plywood (DFP): to CSA O121, standard construction.

.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.3 Sheathing panels: to CAN/CSA-O325.

2.3 FABRICATED TRUSSES

.1 The wood truss supplier shall be responsible for the design and supply of all roof trusses, gable end trusses, bridging and hardware required for the connections.

.2 The wood truss supplier shall submit drawings bearing the seal of an engineer, registered in the Province of Manitoba for review of:

.1 Fabrication drawings of each truss type c/w member sizes, dimensions, and design information.

.2 An erection drawing, showing the location of all truss and other information required by the contractor for the proper installation of the trusses.

.3 Truss layout indicated on drawings is for diagrammatic purposes only. Actual truss layout to be determined by supplier.

2.4 ACCESSORIES

.1 Nails, spikes and staples: to CSA B111.

.2 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

2.5 FACTORY WOOD TREATMENT

.1 Wood Preservative (Pressure Treatment): to CSA O80 Series, using water borne preservative with 0.25 percent retainage.

.2 Surface-applied wood preservative: clear or copper naphthenate water repellent preservative.

3.0 EXECUTION

3.1 FRAMING

.1 All wood framing shall be in accordance with CSA O86-09

.2 Set structural members level and plumb, in correct position.

.3 Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

.4 Place horizontal members, crown side up.

.5 Construct load bearing framing members full length without splices.

.6 All built-up wood columns and post to be continuously blocked down to foundation.

.7 Provide additional studs (cripples) below bearing points of built-up beams and lintels. Number of studs to equal number of plies of beam or lintel unless noted otherwise. Space short studs over and under opening to stud spacing.

.8 Provide continuous horizontal solid blocking @ maximum 4'-0" o/c vertically in all exterior stud walls.

.9 Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists. Frame rigidly into joists.

.10 Bridge framing in excess of 2.3 m span at mid-span. Fit solid blocking at ends of members.

.11 Minimum lintels for stud bearing walls unless noted on drawings:

.1 Openings up to 1m use 2-2x8 SPF

.2 Openings up to 1.5m use 2-2x10 SPF

.12 Place sill gasket directly concrete slab. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

3.2 PREFABRICATED TRUSSES

.1 No site modifications to be made to trusses without prior approval of supplier and Engineer.

.2 All repairs made to damaged trusses to be approved by supplier and Engineer.

3.3 SHEATHING

.1 Secure roof sheathing with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing.

.2 All wall and roof sheathing to be nailed secure in a controlled random pattern as follows:

.1	Panel edges	3” common wire nails @ 6” o.c.
.2	Intermediate supports & blocking	3” common wire nails @ 10” o.c.

.3 Use sheathing clips between sheets between roof framing members.

.4 Secure wall sheathing with long dimension parallel to wall studs, with ends over firm bearing and staggered.

.5 Install telephone and electrical panel back boards with plywood sheathing material where required. Size the back board by 300 mm beyond size of electrical panel.

3.4 STEEL DOOR & FRAME

.1 Prepare rough opening and set steel door frame into opening plum and square.

3.5 BLOCKING, AND STRAPPING

.1 Coordinate and provide wood blocking as required for fitments / equipment / accessories mounting. Anchor blocking securely in place.

3.6 TOLERANCES

.1 Framing Members: 6 mm from true position, maximum.

.2 Surface Flatness of Floor: 2 mm/m maximum.

END OF SECTION

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Shop fabricated wood trusses for roof framing.

.2 Bridging, bracing, and anchorage.

.3 Preservative treatment of wood.

1.2 REFERENCES

.1 Codes and standards referenced in this section refer to the latest edition thereof.

.2 Canadian Standards Association (CSA)

.1 CAN/CSA-O80 Series, Wood Preservation.

.2 CAN/CSA-O86.1, Engineering Design in Wood.

.3 CAN/CSA-O141, Softwood Lumber.

.4 CSA S307-, Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.

.5 CSA S347, Method of Test for Evaluation of Truss Plates Used in Lumber Joints.

.6 CSA W47.1, Certification of Companies for Fusion Welding of Steel.

.3 National Lumber Grades Authority (NLGA)

.1 NLGA, Standard Grading Rules for Canadian Lumber.

.4 Truss Plate Institute of Canada (TPIC)

.1 TPIC, Truss Design Procedures and Specifications for Light Metal Plate Connected Trusses (Limit States Design)

1.3 DESIGN REQUIREMENTS

.1 Design trusses, bracing and bridging in accordance with CAN/CSA-O86.1 for loads indicated and minimum uniform and minimum concentrated loadings stipulated in NBC commentary.

.2 Limit live load deflection to 1/360th of span.

.3 Provide camber for trusses as indicated.

1.4 SOURCE QUALITY CONTROL

.1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

.2 Certify preservative and fire retardant treated wood in accordance with CAN/CSA-O80 Series.

1.5 QUALIFICATION OF MANUFACTURERS

.1 Fabricator for welded steel connections to be certified in accordance with CSA W47.1.

1.6 QUALITY ASSURANCE

.1 Provide Certificate of Quality Compliance from truss manufacturer upon completion of fabrication.

.2 Provide Certificate of Quality Compliance upon satisfactory completion of installation.

1.7 SUBMITTALS

.1 Each shop drawing submission shall bear signature and stamp of professional Engineer/Architect registered or licensed in Province of Manitoba.

.2 Indicate TPIC Truss Design Procedure and CSA O86 Engineering Design in Wood and specific CCMC Product Registry number of the truss plates.

.3 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.

.4 Submit stress diagram or print-out of computer design indicating design load for truss members. Indicate allowable load and stress increase.

.5 Indicate arrangement of webs or other members to accommodate ducts and other specialties.

.6 Show lifting points for storage, handling and erection.

.7 Show location of lateral bracing for compression members.

1.8 DELIVERY AND STORAGE

.1 Deliver, handle, store and protect materials in accordance with Section 01300 – Submittal.

.2 Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

2.0 PRODUCTS

2.1 MATERIALS

.1 Lumber: Spruce (S-P-F) species, No. 2 grade or better, softwood, S4S, with maximum moisture content of 19% at time of fabrication and to following standards:

.1 CAN/CSA-O141.

.2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.

.3 Fastenings: to CAN/CSA-O86.1.

2.2 FABRICATION

.1 Fabricate wood trusses in accordance with reviewed shop drawings.

.2 Provide for design camber and roof slopes when positioning truss members.

.3 Connect members using metal connector plates.

3.0 EXECUTION

3.1 ERECTION

.1 Erect wood trusses in accordance with reviewed erection drawings.

.2 Indicated lifting points to be used to hoist trusses into position.

.3 Make adequate provisions for handling and erection stresses.

.4 Exercise care to prevent out-of-plane bending of trusses.

.5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.

.6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.

.7 Do not cut or remove any truss material without approval of Engineer/Architect.

.8 Remove chemical and other surface deposits on treated wood, in preparation for applied finishes.

3.2 CLEANING

.1 Remove surplus materials, excess materials, rubbish, tools and equipment on completion of installation.

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED WORK

.1 Building Insulations. Section 07210

2.0 PRODUCTS

2.1 SHEET VAPOUR BARRIER

.1 Polyethylene film: to CAN2-51.33-M80, Type 1, 1/4" (6mm) thick.

.2 Rubberized Membrane: self-adhesive rubberized asphalt to waterproof polyethylene, release paper on surface, 40 mil thickness, Grace "Perma-Barrier" or Bakelite "Blueskin SA".

.3 Sprayed Foam: spray applied polyurethane having integral fire inhibitors (flame/smoke/fuel 10/500/0 when tested to ASTM E84.84 or CAN2-S102-M82), as "Safethane 40" by Enerlab West, or approved equivalent. Install at u/s of deck to exterior wall and roof connections.

2.2 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 2" (50mm) wide for lap joints and perimeter seals, 1" (25mm) wide elsewhere.

.2 Staples: minimum 1/4" (6mm) leg.

.3 Adhesives: as recommended by manufacturer.

.4 Electrical box pan: Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

3.0 EXECUTION

3.1 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of vapour barrier.

.2 Install sheet vapour barrier in locations shown on drawings to form continuous barrier.

.3 Use sheets of largest practical size to minimize joints.

.4 Inspect sheets for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.3 SURFACE OPENINGS

.1 Cut sheet vapour barrier to form openings and ensure material is lapped and sealed to frame.

3.4 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.

.2 Lap sheet over sealant and press into sealant bead.

.3 Install staples through lapped sheets at sealant bead into wood substrate.

.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.1 Attach first sheet to substrate.

.2 Lap adjoining sheet minimum 6" (150mm).

.3 Install staples through lapped sheets into substrate or use adhesive.

.4 All vapour barrier lap joints shall occur vertically, over stud, lap and seal with beads of non-hardening acoustic grade caulking to CGSB 19-GP.21

3.6 BARRIER UNDER SLABS

.1 Lay polyethylene membrane vapour barrier over sub-base immediately prior to void form placement.

.2 Lap membrane in full widths, lengths a minimum 6". Do not seal laps, joints. Lap to divert moisture to drain.

.3 Cut tightly and seal to all service projections.

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED SECTIONS

.1	Rough carpentry	Section 06100
.2	Building Insulation	Section 07210

2.0 PRODUCTS

2.1 SHEET AIR BARRIER

.1 Polypropylene film: UV-resistant spun bounded fibres and platinum coloured coating, meets or exceeds the following specifications and properties:

: Basis weight (ASTM D-646) 2.4 oz/yd2 (80.56 g/m5) 16.5 lbs/1000ft2

: Thickness (ASTM D-1777) 0.0095 (0.2413mm) in Bursting strength (ASTM D-774) 123 psi (86477 kg/m5)

: Tensile strength (ASTM D-1682-GRAB, ASTM D-4632-GRAB) 90 lbs md 76 lbs xd (41 kg md 34.5 kg xd)

: Trapezoidal tear (ASTM D-1117) 18 lbs md 23 lbs xd (8.18 kg md 10.45 kg xd)

: Gurley hill porosity (TAPPI T-460, ASTM D-726) 10-20 sec/100cc

: Moisture vapour transmission rate (ASTM E-96, procedure A) 125 gm/m2/ 24 hr

: Flame Spread Index (ASTM E-84-86) 0 Smoke Developed Value 15

: Roll sizes (1,000 ft2/roll) 9' x 111.1' 4.5' x 222.2' (1.37M x 67.6M)

.2 Acceptable Products

.1 "Typar Housewrap" by Reemay Inc. / / “Tyvek CommercialWrap" by DuPont.

2.2 FLASHING

.1 Self-adhering polyethylene laminated flashing with Butyl Rubber adhesive to AAMA 711-07 Voluntary Specification for Self-Adhering Flashing for installation of exterior wall fenestration.

.2 Acceptable Products

.1 DuPont “FlexWrap NF”, 9” width.

3.0 EXECUTION

3.1 INSTALLATION

.1 General:

.1 Apply Typar/Tyvek immediately after framing is completed and insulation has been installed and before windows and doors are installed.

.2 If applying over sheathing, use large-head sheathing nails long enough to penetrate and grip framing studs.

.3 Alternatively attach Typar/Tyvek to gypsum board sheathing with staples.

.4 Overlap all joints a minimum of 6" (150mm) and completely tape all joints with manufacturer's recommended tape.

.5 Tape all penetrations through the membrane namely brick ties, conduit and duct sleeves.

.6 Wrap all fenestration rough opening with Self-Adhering “FlexWrap NF” and seal to air barrier and vapour barrier.

.2 Application:

.1 Apply in accordance with manufacturer's instructions.

.2 Pull the fabric snug before fastening. Overlap each subsequent roll up to 18 inches ensuring that guide marks align with studs.

- END OF SECTION-

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED WORK SPECIFIED ELSEWHERE

.1	Cast-In-Place Concrete	Section 03300
.2	Earthwork	Section 02200
.3	Rough Carpentry	Section 06100
.4	Sheet Vapour Barrier	Section 07192
.5	Sheet Air Barriers	Section 07198
.6	Gypsum Board	Section 09250

1.3 QUALITY ASSURANCE

.1 Execute this work by a firm who has adequate plant, equipment and skilled workers to perform work expeditiously and is known to have been responsible for satisfactory installations similar to that specified for the past immediate five (5) years.

.2 Employ only workers having experience and an understanding of the design principles of air barriers.

1.4 SUBMITTAL

.1 Conform to Section 01300.

.2 Submit samples of insulation, adhesives and accessories for review prior to purchase of materials for the work.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to the site, in original unopened packages, clearly indicating manufacturer's name, brand name, and other identifying information.

.2 Store materials in a dry location off-the-ground, and in such a manner as to prevent damage or intrusion of foreign matter. Replace all materials that become damaged or otherwise unfit for use during delivery, or storage without additional charge.

2.0 PRODUCTS

2.1 MATERIALS

.1 Perimeter Insulation: Extruded polystyrene, Type 4 "Styrofoam SM" by:

Dow Chemical Canada Inc. or approved equal.
"R" Value: 5 per inch.
Thickness: As detailed.
Location: Around exterior walls and foundation where noted.

.2 Hi Density Insulation: Extruded polystyrene, Type VI “Styrofoam HIGHLOAD 40”

Dow Chemical Canada Inc. or approved equal.

"R" Value:	5 per inch.
Thickness:	As detailed.
Compressive Strength:	40 psi.
Location:	under thicken edge slab where noted.

.3 Loose Batt Insulation: "Friction Fit Batt" by Fiberglas Canada Inc. or approved equal.

.4 Sprayed Foam Insulation: spray applied polyurethane having integral fire inhibitors (flame/smoke/fuel 10/500/0 when tested to ASTM E84.84 or CAN2-S102-M82), as "Safethane 40" by Enerlab West, or approved equivalent. Install at all exterior door frames

.5 Gypsum Board: exterior grade, 1/2" (13mm) thick, to CSA A82.27-M1977.

.6 Gypsum Board Fasteners: recommended by gypsum board supplier and approved by the Consultant.

.7 Adhesive: recommended by insulation supplier for particular substrate.

.8 Sealant: "795" by:

- Dow Corning Canada Inc.
  6747 Campbello Road
  Mississauga, Ontario L5N 2M1
  Tel: (416) 826-9600
  or approved equal.

.9 Building Paper: No.15 perforated asphalt felt to CSA A123.3-M1979.

3.0 EXECUTION

3.1 COORDINATION

.1 Coordinate this work with that of other trades in regard to timely phasing to prevent prolonged exposure and damage to the insulation, and ensure continuity of the air barrier between all elements of the building.

3.2 INSTALLATION

.1 Install at exterior foundation walls and footing prior to backfilling.

.2 Take measures to ensure that insulation is not damaged or displaced during backfilling.

.3 Rigid wall insulations shall be installed horizontally, and mechanically fastened at maximum 16” o.c. both ways. Butt joints tightly, offset joints and Use only insulation boards free from chipped or broken edges. In below grade locations where there is no footing, fasten 38 x 90 mm pressure treated support at bottom of insulation.

.4 Install insulation after building substrate materials are dry.

.5 Install insulation to maintain continuity of thermal protection to building element and spaces.

.6 Install loose batt insulation in all voids, where indicated on the drawings. Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts. Around exterior windows and doors and other protrusions.

.7 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.8 Offset both vertical and horizontal joints in multiple layer applications.

.9 Install gypsum board sheathing, with joints butted, over structural steel studs.

.10 Where building paper or Tyvek / Typar is specified, mop all joints around bayonet ties penetrating paper with asphalt adhesive so as to prevent moisture infiltration.

.11 Install sprayed foam insulation to all exterior door and window frames.

.12 Install sprayed foam insulation to all floor joists to foundation wall ends.

- END OF SECTION -

1.0 GENERAL

1.1 RELATED SECTIONS

.1 Gutters and Downspouts — Section 07415

.2 Flashing and Trim — Section 07620

1.2 DESCRIPTION

.1 Preformed prefinished site assembled interlocking standing seam metal roof system complete with metal and membrane flashing, trim, closures, seals, and all attaching hardware.

1.3 REFERENCE DOCUMENTS

.1 Codes and standards referenced in this section refer to the latest edition thereof.

.2 Pre-formed roofing systems shall be installed by an applicator trained and approved by the roofing system manufacturer in the proper installation of the specific system.

.3 The Can. Roofing Contractors Association (CRCA) Standards Manual, latest edition, shall be used as a reference standard.

.4 American National Standards Institute (ANSI)

.1 ANSI B18.6.4, Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-93.4, Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished Residential.

.6 Canadian Standards Association (CSA)

.1 CSA B111, Wire Nails, Spikes and Staples.

1.4 PERFORMANCE REQUIREMENTS

.1 Sheet metal roof system and fastenings shall be designed to resist wind positive and negative pressure and snow loads (including drift) normal to the plane of the assembly in accordance with Man. Building Code 2010 Climatic Information, local rainfall and wind negative and positive pressure 1:30 years, temperature range -301C to +701C.

.2 Under the preceding conditions there shall be no failure or permanent set or unsightly buckling or undue stress on anchors, fasteners, seals. Roofing shall remain water and weather-tight and shall not rattle or deform.

1.5 QUALITY ASSURANCE AND SUBSTITUTIONS

.1 Manufacturer and applicator of the metal roofing system shall demonstrate at least ten years experience in fabrication and installation of architectural metal roofing projects similar in scope.

.2 Substitutions of alternate metal roofing systems not specified in this section must meet this performance standard, and will be considered as follows:

.1 A written request for approval of a substitution is received at least ten (10) days prior

to tender closing.

.2 The request includes a complete item-by-item description comparing the proposed substitution to the specified system, together with manufacturer's literature, samples, test data, engineering standards and performance evaluation indicating comparable standards to those specified.

.3 Approved alternate substitutions must be shown in an addendum issued prior to the tender closing.

.3 Manufacturer and/or approved applicator must have the single source facility to provide:

.1 Total design of the metal roofing system.

.2 Technical literature on tested metal roofing systems.

.3 Engineering and drafting facilities.

.4 Fabrication of metal roofing system and associated components.

.5 Technical representatives.

.6 Field installation by approved certified erectors.

1.6 SUBMITTAL

.1 Submit samples and drawings in accordance with Division 1.

.2 Submit samples of materials, formed joints, fastenings, snow guards, metal colour, for approval prior to commencing work concerned.

.3 Provide detail drawings showing standing seam/cleat assembly, flashing, end returns. Show spacing of seams and laps.

.4 Snow Guard Layout showing snow guard spacing and location, roof dimensions and ground snow load.

1.7 HANDLING AND PROTECTION

.1 Store roofing products in accordance with manufacturer's recommendations.

.2 Protect prefinished steel during fabrication, transportation, site storage and erection, in accordance with CSSBI Standards.

1.8 GUARANTEE/WARRANTY

.1 Upon completion of the work provide metal roofing manufacturer's ten (10) year warranty certificate in the Owner's name.

2.0 PRODUCTS

2.1 MATERIALS

.1 Galvanized Sheet Steel: to ASTM A446M-85, commercial quality, Z275 zinc coated to ASTM A525-86. Thickness minimum as specified.

.2 Preformed metal roofing including all trims, flashing:

- Pre-finished Metal Roof Panels with Hidden Fastener
  Vic West – Prestige – 16" panel width, 26 gauge
  colour - to be selected from standard "WeatherX" colour.

- Pre-finished Perforated Metal Soffit Panels
  Vic West profile CL7015R, 26 gauge, perforated
  Colour – to be selected from standard colour.

.3 Preformed metal wall cladding including all trims, flashing:

- Pre-finished wall panels
  Vic West profile “Diamond Rib” 30”, 26 gauge
  Colour - to be selected from standard colour.

.4 Sheet material: (rubberized asphalt) as Grace "Ice and Water Shield" or Bakor "Blueskin SA", self-adhering, 40 mil thickness.

.5 Separator sheet: unsaturated felt to CSA A123.2M, Class C, #15; resin sized sheets.

2.2 COMPONENTS

.1 Flashing (ridge, valley, side, fascia, etc.) pressure plates, closures, caps, etc., all roofing manufacturer's standard, finish to match metal roofing.

.2 Hardware: as recommended by metal roofing manufacturer, corrosion resistant nails, screws, washers.

.3 Horizontal Z girt as required for wall cladding applications.

.4 Sealant, Gaskets, Tape, Closures: roofing manufacturer's standard for specific application and use.

.5 Snow Guards: injection molded clear polycarbonate with UV stabilizer, adhesive mounted - Surebond SB-190 Everseal adhesive; 3”w x 2 ½”h x 4”l, Snojax - “SnoBlox Deuce” or approved equivalent.

.6 Eavestrough and Downspout: provide 4” x 4” eavestrough to match roof slope complete with clips at 24” o.c. and DS-4 4” x 4” open face downspouts complete with support support straps. Finish to match metal roofing.

.7 Gables Vents: Pre-finished aluminum gable vent, 22” octagonal shape with horizontal louvres, formed brick mould and concealed insect screen. Manufactured by Kaycan, Model # 5081 22” Octagon with 81 sq. in venting area. Colour to be selected.

2.3 FABRICATION

.1 Fabricate metal roofing of pre-finished sheet steel to approved drawings and details, flat pan with turned-up edges, standing lock seam type.

.2 Form roofing pans to maximum lengths, to profile specified, with interlocking lap joints staggered down slope.

.3 Fabricate flashing, returns, side trim, corners, etc., all brake formed, all same material as roofing.

.4 All bends hard, sharp machines made to provide a true, straight line.

.5 Form cleats, and other sheet metal work hidden in final assembly, of galvanized sheet metal.

2.4 MANUFACTURER

.1 Pre-formed metal roofing to profile detailed, by Vic West or approved equals.

.2 Snow Guards manufactured by SnoJax – 1405 Brandton Road, Mechanicsburg, PA 17055 Ph: 1-800-766-5291

3.0 EXECUTION

3.1 INSPECTION/PREPARATION

.1 Carefully inspect steel channel roofing support members, verify smooth and securely fastened, no projecting nails, screws, or sharp edges, plywood securely fastened to steel deck under.

.2 Apply rubberized asphalt membrane to steel channel roof support, at ridges and hips laid to weather, lapping 8" along edges, 12" at ends. Seal edges with plastic caulking.

.3 Coordinate installations of rubberized asphalt and torch on membrane with other flashing and membranes where applicable to ensure a water-tight installation.

3.2 INSTALLATION

.1 Install metal roofing system over roof deck / sheathing to approved details using only skilled and experienced roofers, in accordance with metal roofing manufacturer's instructions.

.2 Install pre-formed metal standing seam roofing to approved details, anchoring securely in place, all joints water and weather-tight.

.3 Apply rubberized asphalt membrane, immediately under metal roofing over roof deck / sheathing.

.4 Install metal wall cladding over horizontal Z girts spaced at 24” o.c. over wall studs and structural steel members.

.5 Install edge trim, flashing, transition pieces, drip moulding.

.6 Build-in and coordinate flashing, trim, end and corner segments, all as required for a proper water and weather-tight roof. All seams parallel.

.7 Build-in provision for thermal movement of metal such that it will not budge, twist, buckle or oil-can under temperature changes or wind or snow loads.

.8 Attach snow guards to roof using adhesive installation method following manufacturer’s instruction. Snow guards spacing layout as per manufacturer’s recommendations.

.9 Install metal fascia and vented soffit including all necessary trim pieces. Soffit to be secured with screws, installed in interlocking joint and center rib and screwed into existing wood fascia. All mouldings and trims to be fastened using screws at maximum 400 mm (16”) o.c.

3.3 PROTECTION

.1 All persons working on or around metal roofing surfaces must wear soft rubber soled footwear.

.2 Do not allow any persons, other than roof metal manufacturer's qualified applicators, to work on or over metal roofing.

.3 Any metal roofing materials, surfaces or finishes damaged, disfigured, marred or scratched will be rejected and shall be replaced at no cost to the Owner.

- END OF SECTION -

1.0 GENERAL

1.1 RELATED SECTIONS

.1	Framing and Sheathing	Section 06112
.2	Preformed Metal Cladding / Roof	Section 07412
.3	Painting	Section 09900

2.0 PRODUCTS

2.1 SHEET METAL MATERIALS

.1 Items not exposed to view: Galvanized steel sheet, commercial quality to ASTM A526-71 (1975) with G90 designation zinc coating to ASTM A525-78 (or Dofasco Galvalume). Thickness 0.80 mm (22 ga.) unless noted otherwise.

.2 Items exposed to view: Pre-finished galvanized steel sheet with factory applied coating to ASTM A446-72, in HMP / 8000 series, and in accordance with CSSBI Bulletin #5, latest edition. Thickness 24 ga. unless noted otherwise. Colour to be selected from complete Dofasco range.

2.2 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CGSB 37-GP-5M.

.3 Sealants: in accordance with Section 07900, colour selected by consultant.

.4 Cleats: of same material, and temper as sheet metal, minimum 50 mm (2@) wide. Thickness same as sheet metal being secured.

.5 Fasteners: of same material as sheet metal, to CSA B111-1974, flat head roofing nails of length and thickness suitable for metal flashing application.

.6 Washers: of same material as sheet metal, 1 mm thick with rubber backings.

.7 Solder: to ASTM B32-76, 50% tin and 50% lead.

.8 Flux: rosin, cut muriatic acid, or commercial preparation suitable for materials to be soldered.

2.3 FABRICATION

.1 Fabricate metal flashing and other sheet metal work to applicable CRCA “FL” series specifications and as detailed.

.2 Form pieces in 2400 mm (8 ft.) maximum lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

.6 For all fascia and trim applications:

.1 Form fascia and trims to profiles and reveals as detailed.

.2 24 gauge pre-finished galvanized steel to be shop adhered over 1/2" exterior plywood.

.3 Provide 1/2" wide matching pre-finished steel vertical joint / reveal at 10 ft. o.c. as required to facilitate fastening of profile to supporting structure.

2.4 METAL FLASHING

.1 Form flashing to profiles indicated of minimum 0.80 mm thick galvanized steel unless otherwise indicated.

2.5 METAL EAVESTROUGH AND DOWNSPOUT

.1 Refer to Section 07412 Preformed Metal Cladding / Roof

2.6 PRE-FORMED SOFFIT

.1 Refer to Section 07412 Preformed Metal Cladding / Roof

3.0 INSTALLATION

3.1 INSTALLATION

.1 Install sheet metal work as detailed.

.2 Use concealed fastenings except where approved by Consultant before installation.

.3 Counter flash bituminous flashing at intersections of roof with vertical surfaces and curbs. Flash joints using standing seams forming tight fit over hook strips, except where otherwise shown.

.4 Lock end joints and caulk with sealant.

- End of Section 07620 -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

.2 All sealing required to seal the building and to withstand the action of the elements and to complete the building air/vapour barrier and not specified elsewhere shall be considered as part of this work.

1.2 RELATED WORK SPECIFIED ELSEWHERE

.1	Concrete	Section 03300
.2	Preformed Metal Siding / Roof	Section 07412
.3	Steel Doors, Frames and Screens	Section 08100
.4	Gypsum Board	Section 09250

1.3 QUALITY ASSURANCE

.1 Execute this work by a firm who has adequate plant, equipment and skilled workers to perform work expeditiously and is known to have been responsible for satisfactory installations similar to that specified for the past immediate five (5) years.

1.4 SUBMITTAL

.1 Conform to Section 01300.

.2 Submit for approval samples of materials specified herein for approval, and obtain approval before materials are delivered to the site. Make samples of sealant cured physical samples of manufacturer's complete standard colour line, for each type of sealant specified, indicating general locations of specific colours. Submit samples of the following, 12" (300mm) long minimum:

.1 Sealants (each type)

.2 Joint backing

.3 Joint fillers (each type), insulation

.4 Bond breaker

1.5 DELIVERIES, STORAGE AND HANDLING

.1 Deliver materials to the site in original unopened containers, clearly indicating manufacturer's name, brand name, and other identifying information.

.2 Store materials in a dry location, off-the-ground and in such a manner as to prevent freezing, damage and the intrusion of foreign matter.

.3 Replace materials that have become damaged or otherwise unfit for use during delivery, or storage, at the expense of this trade.

1.6 SITE CONDITIONS

.1 Protection

.1 Provide non-staining means of protection for the completed horizontal sealing installations and where required to protect the work from damage by other trades.

.2 Ensure that ambient and surface temperatures are above 5C and joint conditions are suitable for the materials to be applied.

.3 Protect adjacent finishes from damage, where heavy abrasive cleaning is required such as sandblasting, grinding or wire brushing.

.4 Protect work of other trades from damage. Make good all damage caused by this work at no additional cost.

1.7 WARRANTY

.1 Submit a warranty in accordance with the General Conditions, but for a period of two (2) years.

.2 Defects shall include, but not be limited to staining, discolouration, adhesive or cohesive failure, dirt adhesion, and failure of cured state.

.3 Submit a twenty (20) year warranty on materials (Dow Corning only).

2.0 PRODUCTS

2.1 MATERIALS

.1 All sealants shall be classed as non-bleeding and capable of supporting their own weight, except the self-levelling type sealant for horizontal surfaces.

.2 All sealants, cleaning solvents, fillers and primers shall be compatible with each other and the surfaces to which they are applied.

.3 Colours to be selected later by the Consultant from standard colours.

.4 Joint Backing: non-staining, compressible, round, resilient, non-absorbing, closed cell foam recommended by sealant manufacturer (polyethylene or chemically compatible rod stock of butyl or neoprene). Diameter shall be 25% greater than joint width before installation, compatible with sealant, primer and substrate. Ensure that joint backing is not cut nor punctured during installation.

.5 Bond Breaker: recommended by sealant manufacturer.

.6 Primers: recommended by sealant manufacturer and to suit the various job conditions.

.7 Cleaning Material: Xylol, Methyl-ethyl-ketone, Toluol or recommended by the sealant manufacturer.

.8 Sealants (For vertical and horizontal non-traffic bearing joints (not immersed in water, not for floors).

.1 General construction use, interior and exterior moving and static joints: 1 part silicone to CGSB 19-GP.9Ma; Dow 790, GE Silprof or Tremco Dymeric.

.2 At ceramic tile, FRP panels, vertical wet areas, interior only, moving and static joints: 1 part silicone, mould and mildew resistant, to CGSB 19-GP-22; Dow 786, GE1700.

.3 Interior use only, static (non-moving) joints, dry area (can be painted): 1 part acrylic latex to CGSB 19-GF-17; PRC 4000, Tremco Acrylic Latex, LaPage Gapseal.

.9 Sealants (For all floors and extreme wet areas interior and exterior (not roads or vehicle surfaces):

.1 2 part polysulphide to CGSB 19-GP-3; ORC Rubber Calk 250.

3.0 EXECUTION

3.1 PREPARATION

.1 Substrate

.1 Ensure that surfaces to be sealed are sound, dry, free from dirt, water, frost, loose scale, corrosion, asphalt, paints or other contaminants that may adversely affect the performance of the sealant.

.2 Do not apply sealant until mortar or concrete has cured for 28 days.

.2 Cleaning

.1 Perform cleaning recommended by the sealant manufacturer to achieve acceptable joint surfaces.

.3 Joint Backing

.1 Fill joint with joint backing to provide proper depth to width ratio. Make joint depth half of joint width up to 3/4" (20mm). At expansion joints, provide bond breaker to joint backing material, on surfaces facing sealant only. Joints not less than 3/8" (9mm) deep.

.4 Masking

.1 Mask areas adjacent to the joints as required prior to priming. Prevent contamination of adjacent surfaces. Remove masking promptly after initial set of sealant.

.5 Primer

.1 Prime joints unless priming is not recommended in writing by the manufacturer of the sealant. Apply primer with an approved brush. Perform priming immediately before application of sealant.

.6 Sealant Life

.1 Do not exceed shelf life, pot life and installation time of the materials as stated by the manufacturers.

.2 Be familiar with the work life of the sealant to be used.

.7 Mixing

.1 Use workers trained and competent in the mixing of this material.

.2 Do not mix multi-component materials until required for use. Mix sealants thoroughly with a mechanical mixer capable of mixing at 80-100 rpm without mixing air into the materials.

.8 Stains and Adhesion

.1 Before any sealing is commenced, test the materials for indications of staining and adhesion.

3.2 APPLICATION

.1 Apply materials in compliance with the recommendations of the manufacturers.

.2 Install sealant with manually operated or air pressure operated guns. Use gun nozzles of the proper sizes to suit the joints and the sealant. Use sufficient pressure to fill all voids and joints. Hold the nozzle to the bottom of the joints to ensure complete filling of the joints. Ensure that sealants bond to both sides of joint and backing material.

.3 Ensure that the correct sealant depth is maintained. Joint widths up to 1/4" (6mm) depth equal width. Make bead full, free from air pockets and embedded impurities and having smooth surface, free from ridges, wrinkles, sags, air pockets and embedded impurities. After joints have been completely filled, tool them neatly to a slight concave surface.

.4 Promptly clean adjacent surfaces that have been soiled and leave work in a neat, clean condition. Remove excess materials and droppings using recommended cleaners and solvents. Make good damaged work to original condition at no additional cost.

.5 Sealant in exposed interior locations shall be installed only after finishes to adjacent surfaces have been applied.

.6 Cut out damaged sealant, re-prepare and prime joints and install new material as specified.

.7 Interior sealant shall include both sides of walls and frames where finished installation will be visible.

.8 Apply acrylic latex paintable sealant before painting so it can be painted over. Apply all other sealant after adjacent surfaces painted.

3.3 LOCATIONS

.1 Seal at the junction of the following interior and exterior materials, unless sealant is specified to be included in the work of other trades:

.1 Concrete to metal
.2 Concrete to concrete
.3 Concrete to masonry
.4 Masonry to masonry
.5 Masonry to metal
.6 Metal to metal
.7 Other locations as required

.2 In general, seal the following interior joints:

.1 Interior steel frames - both sides.
.2 At tile work, control joints and joints around fixtures, pipes, door frames and other items meeting or passing through the tile unless a recess feature is indicated or sealed under Section 09300.

.3 In general, seal the following exterior joints:

.1 Exterior steel frames - exterior and interior side.
.2 Thresholds, three beads minimum.
.3 Pipes and metal protrusions through the building envelope.
.4 Louvres and metal cladding.

.4 The fact that the drawings do not show all locations to be sealed, does not limit responsibility to seal all locations required to create and secure a continuous enclosure.

3.4 FIELD QUALITY CONTROL

.1 Site Meeting

.1 Arrange with the sealant manufacturers for a visit at the job site by one of their technical representatives before beginning the installation, to discuss with the Consultant the procedures to be adopted, site conditions and inspection of the surfaces and joints to be sealed, make recommendations and list procedures.

.2 Discuss the following items:

a) Weather conditions under which work will be done.
b) Anticipated frequency and extent of joint movement.
c) Joint design (shape).
d) Suitability of Durometer hardness and other properties of material to be used in relation to Items 1 to 3 above.
e) Number of beads to be used in the sealing operation.
f) Analysis of job conditions, temperature, wind, moisture, orientation, heating provisions and protection.
g) Correct size of joint for proposed sealant.
h) Inspection of surfaces and joints.
i) Installation recommendations.
j) Mixing procedures for multi-component sealants, and sealant pot life.
k) Compatibility of materials where different types of sealants meet; where materials will be applied over sealant and where substrate differs.
l) Colour of sealants.
m) Primers or surface treatments used on surfaces to be sealed.
n) Sample installation.

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED WORK SPECIFIED ELSEWHERE

.1	Framing and Sheathing	Section 06112
.2	Finishing Hardware	Section 08700
.3	Gypsum Board	Section 09250
.4	Painting	Section 09900
.5	Electrical	Division 16

1.3 QUALITY ASSURANCE

.1 Execute this work by a firm who has adequate plant, equipment and skilled workers to perform work expeditiously and is known to have been responsible for satisfactory installations similar to that specified for the past immediate five (5) years.

.2 Conform to Canadian Manufacturing Standards for Steel Doors and Frames (CMSSDF), published by the Canadian Steel Door & Frame Manufacturer's Association (CSDFMA), latest edition, except as specified otherwise.

.3 Manufacturer shall be a member in good standing of CSDFMA.

.4 Construct steel doors and frames for labelled fire doors, bearing ULC labels. Locate label on the door and frame jamb midway between top hinges.

1.4 SUBMITTAL

.1 Conform to Section 01300.

.2 Submit for review shop drawings indicating components, construction (joining, welds, fastening, sleeving) type of metal, gauges, finishes, reinforcement, door swing, location of hardware, anchors and other pertinent data in large scale detail.

.3 Submit a Door and Frame Schedule. Identify each door and frame with a symbol listed in the schedule and place legibly on the unit at the time of manufacture. Schedule shall refer to architectural drawing symbols and indications.

.4 Submit certificate attesting to compliance of the specifications, and to substantiate design and construction of fire doors and frames. Indicate fire rated assemblies by fire endurance rating.

.5 Submit for approval 12" x 12" (300mm x 300mm) sample of frame corner and door corner, showing construction, hinge cut-out, glazing stop.

1.5 DELIVERIES, HANDLING AND STORAGE

.1 Brace frame units to prevent distortion during shipping and protect finished surfaces, using protective wrappings. Store in accordance with manufacturer's recommendations.

.2 Repair damage to finishes immediately after it occurs to prevent rusting. Use primer for painted surfaces and zinc-rich primer for galvanized surfaces.

1.6 WARRANTY

.1 Warrant the glazing of screens in accordance with the General Conditions, but for a period of two (2) years.

2.0 PRODUCTS

2.1 MATERIALS

.1 Steel Sheet: commercial quality, unpassivated, cold-rolled, stretcher or tension levelled steel sheet to ASTM A525M-86, free from scale, pitting, wave or other defects. Steel for interior doors and frames shall be wipe-coated galvanized ZF075; for exterior doors and frames shall be ZF275.

.2 Door Core Filler:

.1 Exterior Doors and Interior Sound Rated Doors: rigid polyurethane.

.2 Interior Doors (except as above): honeycomb core, 2.5 lbs/cu.-ft. (40 kg/m^3), Kraft paper, 3/4" (19mm) cell size.

.3 Structural Steel Shapes for Support, Reinforcement and Attachment: to ASTM A526M-85, galvanized.

.4 Astragal: 1/8" (3mm) thick x 2" (50mm) wide minimum by full height of door, steel plate, galvanized.

.5 Glazing Stops: rolled steel channel shape, mitred corners, prepared for countersunk, tamper proof screws.

.6 Bituminous Paint: to CGSB 1-GP-108M.

.7 Primer: to CGSB 1-GP-132M.

.8 Float Glass: to CAN2-12.3-M76, 1/4" (6mm) thick, clear.

.9 Wire Glass: To CAN2-12.11-M76 square wired 1/4" (6mm) thick clear, polished.

.10 Glazing Tape: "Tremtape" with integral spacer by:

- Tremco Ltd., 220 Wickstead Avenue, Toronto, Ontario M4H 1G7
  Tel: (416) 421-3300
  or approved equal.

2.2 FABRICATION - GENERAL

.1 Coordinate with other trades prior to fabrication.

.2 Assemble units by spot or arc welding to produce a finished unit with no visible seams or joints, square, true and free of distortion. Welding shall be continuous unless specified otherwise.

.3 Frames: 16 gauge (1.6 mm) thick galvanized sheet steel.

.4 Door and Panel Facings: 18 gauge (1.2 mm) galvanized sheet steel.

.5 Door Core Reinforcement:

.1 Top and Bottom Channel: 18 gauge (1.2 mm) steel sheet.

.6 Door and Frame Reinforcement: steel sheet of the following thicknesses:

.1 Lock and Strike Reinforcement: 10 gauge (3.2 mm) minimum

.2 Closer Reinforcement: 13 gauge (2.3mm) minimum

.3 Channel Spreaders: 13 gauge (2.3mm) minimum

.4 Guard Boxes: 20 gauge (1.0 mm) minimum

.5 Hinge Reinforcement: 10 gauge (3.2mm) minimum

.6 Glass Stops: 20 gauge (1.0 mm) minimum; snap-in type

.7 Jamb Floor Anchors: 10 gauge (3.2mm) minimum

.8 T-anchors: 16 gauge (1.6mm) minimum

.7 Provide cut-outs and conduits and make provision in frame and door as required for electronic security system. Coordinate with Division 16.

.8 Place removable stops for glazing on inner or room side of doors.

2.3 REINFORCEMENT (FRAMES AND DOORS)

.1 Construction and reinforcement specified is the minimum acceptable. Provide additional reinforcement where required. Ensure a permanent, rigid, trouble free installation, able to withstand the stresses of heavy commercial usage.

.2 Weld reinforcement in place at not over 6" (150mm) o.c.

.3 Provide hardware reinforcement and sinkages for doors and frames in accordance with templates furnished by the hardware supplier.

.1 Mortise, reinforce, drill and tap steel doors and frames.

.2 Reinforcement for surface applied hardware such as stops, protective plates and similar items shall provide a tapping thickness of not less than 1/8" (3mm).

.3 Reinforce frame where bolt attachment is indicated.

.4 Door Closer Reinforcement

.1 Provide closer reinforcement for all doors whether scheduled for closers or not. Closer reinforcement shall be provided on both sides of door for all surface mounted closers.

.2 Extend door closer reinforcement for all door frames full width of frame at head.

.5 Hinge Reinforcement: provide hinge reinforcement for doors and full height hinge reinforcement for frames. Tack-weld securely in place at not over 150mm o.c.

.6 Double Acting Door Frame Reinforcement: Provide 6 ga. reinforcement in doorframe heads for double acting swing doors.

.7 Guard Boxes: at hinges and strike, secure guard boxes to frame, except for gypsum board partitions.

.8 Spreaders: install stiffener plates or two angle spreaders where required to prevent bending of frame. Weld reinforcement in place.

.9 Weather Cap: provide vinyl weather cap to top of exterior doors.

.10 Make provisions for glass as indicated and provide removable glazing stops, secured with countersunk oval-head screws.

2.4 FABRICATION - DOOR FRAMES AND SCREENS

.1 Form frames accurately to profiles indicated. Mitre corners. Construct frames straight and free from twist or warp. Cut frame mitres accurately and weld on inside of frame profile. Fill frame corners, exposed surfaces, depressions and butted joints with filler. Sand to a smooth uniform finish.

.2 Frames for installation in masonry walls shall be provided with adjustable corrugated jamb anchors of the 'T' strap or wire type. The number of anchors provided on each jamb shall be as follows:

- Frames up to 7'6" (2300mm) height - 3 anchors.
- Frames 7'6" (2300mm) to 8'2" (2450mm) - 4 anchors.

.3 Frames for installation in gypsum board partitions shall be provided with steel anchors of suitable design, for installation inside each jamb as follows:

- Frames up to 7'6" (2300mm) height - 4 anchors
- Frames 7'6" (2300mm) to 8'4" (2540mm) - 5 anchors

.4 Weld formed floor clip angles of 1/8" (3mm) thick steel to inside of each jamb profile, two holes in each for anchorage to floor. Where required, provide adjustable type floor clip angles.

.5 Where site welding or splicing is required due to size of the unit, indicate location of the weld on shop drawings.

.6 Fit frames with channel or angle spreaders, two per frame, to ensure proper frame alignment. Install stiffener plates or spreaders between frame trim where required, to prevent bending of trim and to maintain alignment when setting in place.

.7 Where frames are to be set in masonry, supply adjustable tee anchors to trade installing frame.

2.5 FABRICATION - STEEL DOORS

.1 Fabricate steel doors flush face, seamless 1-3/4" (45mm) thick and to conform to details and schedules.

.1 Fabricate doors to present a continuous face, free from joints, tool markings and abrasions. Assemble by welding.

.2 Provide both stiles of doors bevelled 1 in 16. Fabricate doors with a clearance of 1/8" (3mm) at head and jamb:

1/2" (10mm) above finished floor where no threshold occurs
1/2" (10mm) above concrete slab where resilient flooring is scheduled
3/4" (20mm) above finished floor where threshold occurs
3/4" (20mm) above concrete slab where carpet is scheduled
1/8" (3mm) between meeting edges of door

.2 For steel doors and panels, spot-weld interior stiffeners when specified at 4" (100mm) o.c. maximum to face sheets laterally. Stiffen steel doors at top and bottom by continuous channels securely welded to both face sheets.

.3 Heat and pressure-laminate honeycomb core to face sheets using epoxy bond.

.4 Provide polyurethane cores in exterior and sound-rated doors.

3.0 EXECUTION

3.1 INSPECTION

.1 Inspect conditions on the site to verify work supplied by other trades is satisfactory.

.2 Report any irregularities to the Consultant in writing.

.3 Commencement of work shall imply acceptance of conditions.

.4 Clean surfaces to be glazed, and prime as recommended by glass manufacturer.

.5 Protect installed work in order to maintain all finishes in perfect condition until acceptance by the Consultant. Any damaged or defective work shall be removed and replaced at no additional cost.

.6 Finished installation shall be free from defects of materials and workmanship.

3.2 INSTALLATION OF STEEL FRAMES AND DOORS

.1 Supply steel doors, steel frames and screens to Section 06112. Section 06112 will distribute and set frames for all partitions. Section 09250 will set and build in frames in this work. Section 06112 will distribute and install all steel doors.

.2 All exterior door frames shall be insulated with sprayed foam insulation.

3.3 INSTALLATION OF GLASS

.1 Install glass in doors and screens.

.2 Remove glazing stops and replace in original locations using original fasteners.

.3 Set glass properly centred with uniform bite, face and edge clearances, free from distortion.

.4 Glass shall bear manufacturer's labels indicating quality. Leave labels in place until final cleaning.

.5 Do not lever or pry glass into place when setting.

3.4 CLEANING

.1 Remove excess glazing compound from installed glass.

.2 Wash and polish both faces of glass.

.3 Remove slight stains or etches using hand polishing with a slurry of cerium oxide of FFFF pumice. Do not use power tools for polishing.

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED WORK

.1 Framing and Sheathing Section 06112

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01300.

.2 Clearly indicate each type of frame and screen, extrusion profiles, method of assembly, section and hardware reinforcement, locations of exposed fasteners, finishes, etc.

1.4 MAINTENANCE DATA

.1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into maintenance manual specified in Section 01700.

1.5 WARRANTY

.1 Contractors hereby warrants aluminum frames, screens and shop fronts against defects and malfunctions under normal usage in accordance with GC24 but for five (5) years.

1.6 CO-OPERATION

.1 Co-operate fully with other trades.

2.0 PRODUCTS

2.1 MATERIALS

.1 Aluminum extrusions: Aluminum Association alloy AA6063-T5.

.2 Sheet aluminum: Aluminum Association alloy AA1100.

.3 Steel reinforcement: To CSA G40.21-M1978.

.4 Steel primer: To CGSB 1-GP-40M.

.5 Fasteners: Aluminum, cadmium plated steel, or stainless steel, finished to match adjacent material.

.6 Weatherstrip: Mohair and/or metal backed wool pile.

.7 Isolation coating: Alkali resistant bituminous paint or epoxy solution.

.8 Sealants: Tremco "Dymeric" in colour to match aluminum.

2.2 FINISHES

.1 Aluminum components: Clear Anodized Finish

.2 Steel clips and reinforcing steel: zinc coating to CSA G164-1965(R1972).

2.3 FABRICATION

.1 Construct frames and screens to profiles and maximum face sizes as shown.

.2 Design frames and screens in exterior walls to:

.1 Accommodate expansion and contraction within service temperature range of -35 deg.C to 75 deg.C.

.2 Limit deflection to l/175th of clear span tested to ASTM E330-79 under wind loads for building locality as ascertained by NBC Supplement No. 1 Climatic Information for Building Design in Canada.

.3 Make allowances for deflection of structure. Ensure that structural loads are not transmitted to aluminum work.

.4 Provide structural steel reinforcement for strength, stiffness and connections.

.5 Fit intersecting members to flush hairline weather tight joints and mechanically fasten together, except where indicated otherwise.

.6 Conceal fastenings from view. Exposed fastenings where indicated.

.7 Form cut-outs, recesses, mortising or milling for finishing hardware to templates supplied. Reinforce with aluminum or galvanized steel plates.

.8 Field apply isolation coating to aluminum in contact with dissimilar metals, cementitious materials.

.9 Place manufacturer's name plates in semi-concealed locations.

2.4 ALUMINUM

.1 Frame for exterior screen:

.1 Aluminum closed extrusion sections 6” deep x 1 ¾” face perimeter frame, 4½” deep x 1 ¾” face intermediate mullion.

.2 System generally: Alumicor or equal extrusions.

.2 Channel Stops

.1 Aluminum channel extrusions top, bottom and sides where abutting Aluminum frames. Size channel stop to be as minimal as possible and still function properly. Glazing to be sized to suit spans indicated. No vertical or horizontal mullions will be tolerated. All vertical joints to be butt glazed with silicone bead connection.

.2 Formed Aluminum channel to be clear anodized finish to match typical entry framing.

3.0 EXECUTION

3.1 INSTALLATION

.1 Install work plumb, square, level, free from warp, twist and superimposed loads.

.2 Secure work in required position. Do not restrict thermal movement.

.3 Install hardware in accordance with templates.

.4 Adjust operable parts for correct functions.

.5 Isolate from cementitious materials.

3.2 CAULKING

.1 Where required seal between members of Aluminum work.

.2 Seal between Aluminum components and adjacent building materials.

.3 Apply sealant in accordance with Section 07900. Conceal sealant within the Aluminum work except where exposed use is permitted by Architect.

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Instructions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED WORK SPECIFIED ELSEWHERE

.1 Steel Doors, Frames & Screens — Section 08100

.2 Division 16

1.3 SCOPE OF WORK

.1 The supply and installation of all door hardware listed elsewhere in this Specification.

1.4 ABBREVIATIONS

Aluminium Mill Finish, Clear Anodized	-	AL
Cadmium Plate	-	C2C
Dull Bronze	-	C10B
Nickel Plated, Dull	-	C15
Chromium Plated, Dull	-	C16D
Dull Stainless Steel	-	C32D
Left Hand	-	LH
Left Hand Reverse	-	LHR
Non-removable Pin	-	NRP
Pressed Steel Frame	-	PSF
Right Hand	-	RH
Right Hand Reverse	-	RHR
Wood Screws	-	WS
Wood Door	-	WD
Wood Frames	-	WF
Self-Tapping Screws	-	STS
Lead Shields	-	LS
Statuary Bronze	-	STAT
Dark Bronze	-	DKB
Fastening Back to Back	-	B/B

2.0 PRODUCTS

2.1 APPROVED MANUFACTURERS

.1 The hardware listed herein shall be sourced from:

Hinges	Stanely, Ives, Hager, McKinney
Locksets	Schlage, Sargent
Door Push / Pull	Standard Metal, Ives, Pemko
Exit Devices	Von Duprin
Door Closers	LCN, Sargent
Overhead Holder	Glynn-Johnson
Door Stops	Standard Metal, Ives, Rockwood
Protection Plates	Standard Metal, Ives, Rockwood

Threshold	Reese, Pemko
Miscellaneous	Standard Metal, KN Crowder, Glynn-Johnson, Pemko
Smoke Seals / Weather strip	Reese, KN Crowder, Pemko

2.2 HARDWARE SCHEDULE

.1 Refer to drawings for hardware schedule.

3.0 EXECUTION

3.1 COOPERATION

.1 Before installing hardware, check drawings for hardware requirements, verify door swings, check shop drawings, frame and door lists, and advice in writing if revisions are required.

.2 Supply to metal frame and door manufacturers, complete information and templates required to provide reinforcing for the application of hardware.

3.2 MOUNTING HEIGHTS

.1 Hardware shall be mounted the following distances from the finished floor measured to the centre of the hardware, unless indicated otherwise:

	Inches	mm
Top Hinge	10"	250 from head of door to top
Bottom Hinge	10"	250 from finish floor to bottom of hinges
Intermediate Hinge	centred between top and bottom hinges	
Locksets, Latchsets	40"	1000
Deadlocks	57"	1450
Panic Device Crossbar	40"	1000
Door Pulls	44"	1100

.2 Contractor to verify existing hinge cut outs where new doors are to be installed in existing frames.

3.3 FIELD QUALITY CONTROL

.1 Ensure that each shipment box contains all of the hardware listed for the door openings.

3.4 GENERAL NOTES APPLICABLE TO ALL HARDWARE SETS

.1 Finishing Hardware will be for heavy duty use, of excellent workmanship, with finishes as listed.

.2 Hardware for fire rated doors shall meet Underwriter's requirements. Submit written certification of conformance to ULC requirements for each type of hardware prior to delivery.

.3 Each hardware item of the same type shall be of the same design and the product of the same manufacturer.

.4 Hardware which fails to function satisfactorily will be replaced by proper hardware at the Finishing Hardware Contractor's expense, including all remedial and installation costs.

.5 Hardware shall be selected and installed in accordance with applicable codes and regulations and to the approval of the local fire marshal.

3.5 KEYING

.1 All doors keyed differently. Confirm keying requirement with the Owner.

.2 Master key will open all locks and as directed by Owner

.3 Grand Master keys will be by Owner. Contractor shall key doorway key and area master to the Grand Master.

.4 Area Master and Individual key shall be supplied by contractor. Provide 4 sets each.

- END OF SECTION -

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Low-E Glass Block Energy Systems.

1.2 RELATED WORK

.1	Joint Sealants.	Section 07900
.2	Painting	Section 09900

1.3 REFERENCES

.1 ASTM C1363-05 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies

.2 NFRC 100-2010 Procedure for Determining Fenestration Product U-factors

.3 NFRC 200-2010 Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

.4 NFRC 500-2010 procedure for Determining Fenestration Product Condensation Resistance Value

.5 ASTM E2190-08 Standard Specification for Insulating Glass Unit Performance and Evaluation

.6 ASTM E283-04 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure and Temperature Differences Across the Specimen.

.7 ASTM E330-02 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.8 ASTM E547-00 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.

.9 ASTM B209M-07 Standard Specification for Aluminum and Aluminum–Alloy Sheet and Plate.

.10 ASTM C920-08 Standard Specification for Elastomeric Joint Sealants.

.11 CPSC 16 CFR 1201 – Safety Impact Test.

1.4 QUALITY ASSURANCE

.1 Manufacturer

.1 Minimum of 10 years specialized experience in the manufacture of windows.

.2 Direct Representation

.1 The manufacturer shall have available a direct representative with full knowledge and experience of the product and systems for technical assistance.

1.5 SUBMITTALS

.1 Submit under provisions of Section 01330

.2 Product Data: Manufacturer's literature on each product to be used, including:

.1 Preparation instructions and recommendations.

.2 Storage and handling requirements and recommendations.

.3 Written installation instructions.

.3 Verification Samples:

.1 Two glass block units of each type specified, showing size, design, and pattern of faces as required for project.

.2 Representative samples of assembly as required for project.

.4 Test Reports:

.1 Submittal of test reports from independent laboratories indicating conformance to regulatory requirements shall be made available if required by architect.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Handle panels in a manner which will prevent undue stress on component parts, sealants and structural members. Do not rack or torque, or cause load forces in an inappropriate manner

1.7 PROJECT CONDITIONS

.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

.1 Provide manufacturers limited 10-year warranty.

2.0 PRODUCTS

2.1 MANUFACTURERS

.1 Acceptable Manufacturer: Pittsburgh Corning Corporation, which is located at: 800 Presque Isle Drive, Pittsburgh, PA 15239-2724; Toll Free Tel: 800-545-5001; Tel: 724-327-6100; Fax: 724-387-3806; Email: request info; Web: www.pittsburghcorning.com

2.2 SYSTEM DESCRIPTION

.1 Design Requirements

.1 Energy efficient system shall conform to the requirements specified for the particular items and shall be complete assemblies by a single manufacturer.

.2 Performance Requirements

.1 The system shall meet or exceed heat transfer (U-factor) and solar heat gain (SHGC) performance levels specified.

.3 Basis for Design: Pittsburgh Corning LightWise Architectural Energy Efficient Series

.1 U-factor of product: Per NFRC 100-2010

a) Unframed 0.34
b) Framed 0.38

.2 R-value of product:
a) Unframed 2.94
b) Framed 2.63

.3 Solar Heat Gain Coefficient (SHGC) of product: Per NFRC 200-2010
a) Framed 0.27

2.3 GLASS BLOCK

.1 Basis for Design: Pittsburgh Corning Energy Efficient Series

.1 Patterns
a) Energy Efficient IceScapes® Glass Block

.2 Physical Properties:

a) Nominal Size; Face: 8 inches (203mm) by 8 inches (203mm) by 3.5 inches (89mm) thick
b) Installed Weight 15 lb/sq. ft
c) Visible Light Transmission: 33%-76% (dependent on pattern)

2.4 ACCESSORIES

.1 A. Sealant (caulk): Non-staining; waterproof mastic; silicone type meeting the requirements of ASTM C920.

.2 Aluminum 2-piece Channel System: Anodized or powder coated as required.

.3 ProVantage 1 Glass Block installation system for perimeter channels system.

.4 Anchorage: Self-tapping screws and masonry anchors as prescribed per substrate.

.5 Shims: Plastic type shims as required

3.0 EXECUTION

3.1 EXAMINATION

.1 Do not begin installation until substrates have been properly prepared.

.2 Notify architect of unsatisfactory preparation before proceeding.

.3 Verify that channels for support at head, jambs and sills are properly installed.

3.2 PREPARATION

.1 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

.1 Install Energy Efficient Glass Block System in strict compliance with the manufacturers' specifications, sizing, anchorage charts and installation instructions including all materials, accessories, workmanship and cleaning.

3.4 CLEANING

.1 Remove excess sealant from glass surfaces immediately following application.

3.5 PROTECTION

.1 Protect installed products until completion of project.

.2 Touch-up, repair or replace damaged products before Substantial Completion

- END OF SECTION -

1.0 GENERAL

1.1 RELATED SECTIONS

.1	Submittal	Section 01330
.2	Framing and Sheathing	Section 06112
.3	Building Insulation	Section 07210

1.2 REFERENCES

.1 Codes and standards referenced in this section refers to the latest edition thereof.

.2 American Society for Testing and Materials International, (ASTM)

.1 ASTM C36/C36M, Specification for Gypsum Wallboard.

.2 ASTM C475, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.3 ASTM C514, Specification for Nails for the Application of Gypsum Board.

.4 ASTM C630/C630M, Specification for Water-Resistant Gypsum Backing Board.

.5 ASTM C840, Specification for Application and Finishing of Gypsum Board.

.6 ASTM C931/C931M, Specification for Exterior Gypsum Soffit Board.

.7 ASTM C954, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.8 ASTM C1002, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.9 ASTM C1047, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.3 Association of the Wall and Ceilings Industries International (AWEI)

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.5 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SAMPLES

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

.2 Submit 300 mm size samples of corner and casing beads insulating strip.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.5 SITE ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10° C, maximum 21° C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.6 QUALIFICATIONS

.1 Dry wall installers: minimum 5 years proven experience.

1.7 MOCKUPS

.1 Submit Mock-Ups in accordance with Section 01450 – Quality Control.

.2 Construct mock up gypsum board wall installation including one inside corner and one outside corner. Mock-up may be part of finished work.

.3 Allow 24 hours for inspection of mock-up by Engineer/Architect before proceeding with rest of the work.

2.0 PRODUCTS

2.1 MATERIALS

.1 Standard board: to ASTM C36/C36M regular, 12.7 mm thick and Type X, 15.9 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.

.2 Water-resistant board: to ASTM C630/C630M regular, 12.7 mm thick and Type X, 15.9 mm thick, 1200 mm wide x maximum practical length.

.3 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30 galvanized.

.4 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.5 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.6 Nails: to ASTM C514.

.7 Steel drill screws: to ASTM C1002.

.8 Stud adhesive: to CAN/CGSB-71.25.

.9 Laminating compound: as recommended by manufacturer, asbestos-free.

.10 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, metal, zinc coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.

.11 Sealants: in accordance with Section 07900 - Joint Sealers.

.12 Acoustic sealant: CGSB 19-GP-21M.

.13 Polyethylene: to CAN/CGSB-51.34, Type 2.

.14 Insulating strip: rubberized, moisture resistant, 3 mm thick cork strip, 12 mm wide, with self-sticking permanent adhesive on one face, lengths as required.

.15 Joint compound: to ASTM C475, asbestos-free.

2.2 FINISHES

.1 Texture finish: asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

3.0 EXECUTION

3.1 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.

.3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.4 Install work level to tolerance of 1:1200.

.5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, and other protrusions.

.6 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.7 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.8 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.9 Install wall furring for gypsum board wall finishes in accordance with ASTM C840, except where specified otherwise.

.10 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.11 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.2 APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical works are approved.

.2 Apply double layer gypsum board to wood or metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm oc.

.3 Apply single layer gypsum board to concrete or concrete block surfaces, where indicated, using laminating adhesive.

.4 Apply water-resistant gypsum board where wall tiles are to be applied and adjacent to slop sinks janitors closets. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.5 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.

.6 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.7 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.

.8 Install gypsum board with face side out.

.9 Do not install damaged or damp boards.

.10 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.3 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm oc using contact adhesive for full length.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.6 Provide continuous polyethylene dust barrier behind and across control joints.

.7 Locate control joints at changes in substrate construction.

.8 Install control joints straight and true.

.9 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.

.10 Install expansion joint straight and true.

.11 Install access doors to electrical and mechanical fixtures specified in respective sections..

.1 Rigidly secure frames to furring or framing systems.

.12 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.13 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:

.1 Levels of finish:

a) Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.(For use where water resistant gypsum backing board is used as a substrate for tile.)

b) Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.14 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.15 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.16 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.17 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.18 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.

.19 Mix joint compound slightly thinner than for joint taping.

.20 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.21 Allow skim coat to dry completely.

.22 Remove ridges by light sanding or wiping with damp cloth.

.23 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

3.4 SCHEDULES

.1 Construct fire rated assemblies where indicated, seal penetrations, as per Section 07840 Firestopping.:

- END OF SECTION -

1.0 GENERAL

1.1 SUMMARY

.1 Section Includes: This section includes labor, materials and other services necessary to complete resilient sheet flooring, slip resistant sheet vinyl safety flooring systems and accessories work. Conform with requirements of all Sections of Division 1, General Requirements, as it applies to the work of this Section.

.2 Related Sections:

.1	Cast-in-Place Concrete: Concrete finishing	Section 03300
.2	Framing and Sheathing.	Section 06112
.3	Hygienic Rigid Sheet Vinyl Wall Covering	Section 09720
.4	Thermal and Moisture Protection	Division 7
.5	Mechanical.	Division 15

1.2 REFERENCES

.1 **ASTM D 2047**, Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.

.2 **ASTM E 648/NFPA 253**, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

.3 **ASTM E662**, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

.4 **ASTM F710**, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

.5 **ASTM F 970**, Standard Test Method for Static Load Limit.

.6 **ASTM F1482**, Standard Guide to Wood Underlayment Products Available for Use under Resilient Flooring.

.7 **ASTM F1303**, Standard Specification for Sheet Vinyl Floor Covering with Backing.

.8 **ASTM F2170**, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

.9 **Underwriters Laboratories of Canada (ULC)**

.1 CAN/ULCS – 102.2 Fire Tunnel Test – Surface Burning Characteristics of Flooring, Floor covering and Miscellaneous Materials and Assemblies

.10 **(RFCI) Resilient Floor Covering Institute**

.1 RFCI Standard Slab Moisture Test Method (Calcium Chloride Method)

1.3 SUBMITTALS

.1 Product Data: Submit manufacturer’s current printed product literature, specifications, installation instructions, and field reports in accordance with Section 01330 - Submittal Procedures

.2 Shop Drawings: Submit shop drawings to indicate materials, details, and accessories in accordance with Section 01330 - Submittal Procedures including but limited to the following:

.1 Submit a cut diagram indicating seam locations and roll direction. Use mitered seam layouts for corners when changing directions 180 degrees (e.g. when running material down corridors which bisect at a right angle), unless approved otherwise.

.3 Samples: Submit duplicate 6" x 9" (152 mm x 228 mm) sample pieces of sheet material, 12" (300 mm) long [gulley edge] [cap strip] [joint cover strip] [cove former] in accordance with Section 01330 - Submittal Procedures.

.4 Closeout Submittals: Submit the following:

.1 Operation and Maintenance Data: Submit manufacturer's operation and maintenance data for incorporation into manual specified in accordance with Section 01780 - Closeout Submittals. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.4 QUALITY ASSURANCE

.1 Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

.1 Training: Installer who has attended an Altro flooring installation training clinic.

.2 Mock-ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing.

.1 Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.

.2 Incorporation: Mock-up may be incorporated into final construction upon Owner's approval.

.3 Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, manufacturer's warranty requirements, and installer qualifications.

1.5 SITE CONDITIONS

.1 Temperature Requirements: If storage temperature is below 65F (18C) or the floor temperature is below 50F (18C), the Altro safety flooring product must be moved to a warmer place and allowed to reach this temperature before unrolling or installation. For further information, refer to current Altro Installation Practices and Quick Facts.

.2 Maintain air temperature and structural base temperature at flooring installation area between 68F (20C) and 80F (26C) for 48 hours before, during and 24 hours after installation.

1.6 WARRANTY

.1 Warranty period for Altro Maxis Unity shall be 15 years commencing on date of substantial completion. Refer to conditions of the contract for project warranty provisions.

2.0 PRODUCTS

2.1 SAFETY FLOORING

.1 Slip Resistant Sheet Vinyl Manufacturer: Maxis Unity by Altro, Telephone 800.377.5597, Fax 610.746.4325; E-Mail Assistance: info@altrofloors.com

.2 Acceptable material: Altro Maxis Unity (measurements and product weights given below are approximate): Slip Resistance D .81 / W .89; Thickness 0.10" (2.5 mm); Roll Width 6'-7" (2 M); Roll Length 66' (20 M); Roll Weight: 275 lb. (125 kg)
Colour to be selected from manufacturer's Chipped Colour range.

2.2 ACCESSORIES

.1 **Vinyl welding rod**: Acceptable material:
.1 Altro weld rod

.2 **Cove Former**: Acceptable material, sized to suit application:
.1 Altro Cove former: 20R - 24 mm (1") radius.

.3 **Gulley edge**: Acceptable material, vinyl, sized to suit application if required:
.1 Altro Gulley Edge [GA 35/25] [GE 35RE] [GE 25RE] where applicable.

.4 **Cap strip**: Acceptable material, sized to suit application,
.1 Altro Cap Strip: C7.

.5 **Subfloor Filler and Leveler**: Use only gray Portland cement-based "moisture tolerant" underlayment, and patching compounds. Use for filling cracks, holes or leveling. White gypsum materials are not acceptable.

.6 **Metal edge strips**:
.1 Aluminum extruded, smooth, mill finish with lip to extend over flooring if required.

3.0 EXECUTION

3.1 EXAMINATION

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

.2 Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.2 PREPARATION

.1 Safety flooring shall be installed over subfloors conforming to ASTM F710 for concrete and other monolithic floors or ASTM F1482 for wood subfloors.

.2 Always conduct moisture tests per ASTM F-2170 on all concrete slabs regardless of age or grade level. ASTM F-2170 Internal Relative Humidity (IRH) test results must not exceed 85%.

.3 Do not proceed with work until results of moisture condition tests are acceptable.

.4 When patching, a moisture tolerant patching compound must always be used.

3.3 INSTALLATION

.1 Maxis Unity Installation: Install Altro safety flooring in accordance with the current posted Altro Installation Practices and Quick Facts Guide. All Seams shall be heat welded with Altro Weldrod™ only. Failure to install Altro safety flooring in accordance with recommended procedures will void the Altro Limited Product Warranty.

.2 Coved Installation: Where Altro safety flooring is coved up wall surfaces and other abutments, installation shall be in accordance with Altro safety flooring Installation Practices using the following accessories:

.1 At standard wall finishes: Use Altro C7 vinyl cap strip to accommodate sheet vinyl to a height as indicated.

.2 At Altro Whiterock semi-rigid wall cladding or FRP paneling: Wall Panel to overlap cove a minimum 2” (50 mm). Overall exposed cove to view shall be 4” height.

.3 At 0.75" (19.1 mm) radius coving at juncture of vertical and horizontal surfaces: Use Altro Vinyl Cove Former 20R.

.4 Top set cove base: Install in accordance with manufacturer’s instructions.

3.4 CLEANING

.1 Cleaning: Remove temporary coverings and protection of adjacent work areas.

.1 Repair or replace damaged installed products.

.2 Clean installed products in accordance with manufacturer’s instructions prior to Owner’s acceptance.

3.5 PROTECTION

.1 Cover and protect finished installation from damage from other trades using a non-staining, temporary floor protection system, such as reusable textured plastic sheeting.

.2 Maxis Unity should be covered and protected from all other trades during construction with a suitable non-staining protective covering without taping to the surface of the flooring.

- END OF SECTION -

1.0 GENERAL

1.1 SUMMARY

.1 Section Includes: This section includes labor, materials and other services necessary to complete the Hygienic Rigid Sheet Vinyl Wall Covering and accessories work. Conform with requirements of all Sections of Division 1, General Requirements, as it applies to the work of this Section.

.2 Related Sections:

.1	Cast-in-Place Concrete: Concrete finishing	Section 03300
.2	Framing and Sheathing.	Section 06112
.3	Resilient Sheet Vinyl Safety Flooring	Section 09657
.4	Gypsum Board	Section 09250
.5	Mechanical	Division 15
.6	Electrical	Division 16

1.2 REFERENCES

.1 General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

.2 **American Society for Testing and Materials (ASTM)**

.1 ASTM D2583-07, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor.

.2 ASTM E 84-05 Standard Test Method for Surface Burning Characteristics of Building Materials

.3 **Underwriters Laboratories of Canada (ULC)**

.1 CANIULC-S I 01-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULCS – 102.2 Fire Tunnel Test – Surface Burning Characteristics of Flooring, Floor covering and Miscellaneous Materials and Assemblies

1.3 SUBMITTALS

.1 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01330

.2 Indicate by large scale details, thermoformed edges, moldings, dimensions, joints, anchorage and assembly.

.2 Samples:

.1 Submit 300 x 300 mm sample of wall covering and trim in accordance with Section 01330.

.3 Closeout Submittals:

.1 Provide manufacturer's product specifications and maintenance data including maintenance procedures and materials, procedures for stain removal and surface repair, and recommended schedule for cleaning, for incorporation into Operation and Maintenance Manual in accordance with Section 01700 – Contract Closeout Submittals.

1.4 QUALITY ASSURANCE

.1 Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

.1 Training: Installer who has attended an Altro Whiterock installation training clinic; has installed Altro Whiterock successfully.

.2 Mock-ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner’s and Consultant’s acceptance of finish color, texture and pattern, and workmanship standards.

.1 Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.

.2 Incorporation: Mock-up may be incorporated into final construction upon Owner’s approval.

.3 Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer’s installation instructions, manufacturer’s warranty requirements, and installer qualifications.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver all material to site in manufacturer's original unopened packaging with labels clearly identifying product name and manufacturer.

.2 Store materials in a dry, enclosed area protected from exposure to moisture, construction activity, and direct sunlight in strict accordance with manufacturer's recommendations.

.3 Handle all products with appropriate precautions and care as stated manufacturer's instructions.

.4 Cleaning and Waste Management in accordance with Section 01700.

1.6 SITE CONDITIONS

.1 Maintain constant 21° C air temperature at installation area for 72 hours before, during and 48 hours after installation.

.2 Unwrap wall covering to allow acclimatizing in installation area for 72 hours before application.

.3 Provide continuous ventilation during and after wall covering installation. Do not let contaminated air recirculate through existing building air distribution system.

1.7 SEQUENCING

.1 Install vinyl wall panels after application of vinyl sheet flooring with self-cove base specified in Section 09650 has been completed. Coordinate work of this Section with work of Section 09657.

1.8 WARRANTY

.1 Manufacturer's Product Warranty: provide an extended warranty for Work of this Section for a period of 10 years from date of Substantial Performance of the Work. Manufacturer hereby warrants rigid-sheet vinyl wall covering against defects in materials and workmanship subject to proper care and maintenance, and these or other observed defects and deficiencies will be repaired or replaced to the satisfaction of the Consultant and Owner, and at no expense to Owner.

1.9 MAINTENANCE

.1 Comply with requirements of Section 01700.

.2 Provide maintenance materials as follows:

.1 Rigid-Sheet Vinyl Wall Covering: full width equal to 5% of wall area for each type, colour and pattern of wall covering installed. Sheet material to be supplied in one piece.

.2 Adhesives: Sufficient volume to install maintenance materials but not less than unopened 1 litre can of each type of adhesive.

.3 Maintenance materials to be from same dye lot or production run as installed materials.

2.0 PRODUCTS

2.1 MANUFACTURERS

.1 Acceptable Manufacturer: Altro Canada
6221 Kennedy Road, Unit 1, Mississauga ON, L5T 2S8
Toll-free: 800.565.4658 Tel: 905.564.1330 Fax: 905.564.0750
E-mail: info@altrofloors.com Web Site: www.altrofloors.com.

2.2 HYGIENIC WALL COVERINGS:

.1 Acceptable material: Altro Whiterock Satins (measurements and product weights given below are approximate):

.1 STANDARD WHITE W103/00: Thickness: 0.10" (2.5 mm) Extruded Semi-rigid PVCu Sheet; Panel Width: 4’ (1.22m) Panel Height: 8’ (2.5 m); Weight 4’x8’ Panel: 24 lbs (10.4 kg)

2.3 ACCESSORIES

.1 **Joint Strips**: (for vertical joints)
.1 2-Part Joint Strip – A831/25 White; Length 98.5”.

.2 **Start and Edge Trim**:
.1 2-Part Start and Edge Trim – A833/25 White; Length 98.5”.

.3 **Adhesive:**
.1 Mapei ECO 575

.4 **Caulking and Mastic Compounds and Tools**:
.1 Altro Mastic Caulking – A802 White/A803 Clear) 10.5 oz

2.4 SOURCE QUALITY

.1 Source Quality: Obtain wall products from a single manufacturer and from same dye lot or production run.

3.0 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog, installation instructions and product label instructions for installation.

3.2 EXAMINATION

.1 Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.3 PREPARATION

.1 Work penetrating substrata to be completed before installing vinyl wall panels.

.2 Seal and prime wall surface to receive vinyl wall panels in accordance with manufacturer's instructions.

.3 Ensure sheet vinyl safety flooring and flashcoving installation are completed prior to start of work under this section.

3.4 INSTALLATION

.1 Install vinyl wall panels in accordance with manufacturer's instructions. All joints should be joined by approved methods as detailed in the installation guide.

.2 Overlap flashcove base by extending the vinyl wall panel down a minimum of 2" (50 mm) past the top of the flooring flashcove base. Use extra adhesive to fill the gap, and apply a bead of recommended sealant along bottom edge of the vinyl wall panels.

.3 Thermoform on site, all inside and outside corners and specific shapes to suit contours of room.

.4 All vertical joints shall be joined with Altro A831 two-part joint strips following manufacturer's instructions.

.5 All panel edges abutting fitment, door and window frames and other dissimilar material shall be finished with Altro A833 two part start & edge profile following manufacturer's instructions.

.6 Use sheets in consecutive numerical sequence of manufacture including panels above or below windows, doors or similar penetrations. Install full sheets vertically from top of floor cove to height as specified. Do not use filler pieces or spliced partial sheets.

.7 Apply adhesive according to methods recommended by manufacturer. Remove excess adhesive from seams as work progresses, and wipe clean and dry with cloth towel.

.8 To ensure maximum adhesion, roll the material with a laminated roller as recommended by the manufacturer. Roll from the centre of the sheet to the outer edges in all directions to eliminate trapped air pockets.

.9 Install vinyl wall panels before installation of plumbing fixtures, equipment, cabinets etc.

.10 Seal around all holes, cut-outs, etc. with sealant recommended by manufacturer resulting in water-tight penetrations.

3.5 CLEANING

.1 Clean installed products in accordance with manufacturer's instructions prior to final acceptance.

3.6 PROTECTION

.1 Leave protective film on vinyl wall panels to protect surfaces from damage during construction. Remove prior to occupancy.

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

1. Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED SECTIONS

1.	Steel Doors, Frames & Screens	Section 08100
2.	Gypsum Board	Section 09250
3.	Mechanical	Division 15
4.	Electrical	Division 16

1.3 REFERENCES

1. Canadian Painting Contractors' Architectural (CPCA).
   - .1 Painting Specifications Manual 1993.
2. Canadian General Standards Board (CGSB).
   - .1 CAN/CGSB-1.38-M91, Interior Enamel Undercoater.
   - .2 CGSB 1-GP-48M-78, Primer, Marine, for Steel.
   - .3 CAN/CGSB-1.57-M90, Alkyd, Interior, Semigloss, Enamel.
   - .4 CAN/CGSB-1.60-M89, Interior Alkyd Gloss Enamel.
   - .5 CAN/CGSB-1.68-M91, Solvent Type Primer-Sealer for Interior Walls.
   - .6 CAN/CGSB-1.73-M91, Exterior and Interior Enamel for Floors.
   - .7 CAN/CGSB-1.100-M89, Interior Latex Type, Flat Paint.
   - .8 CAN/CGSB-1.102-M89. Clear Alkyd Type Sealer.
   - .9 CAN/CGSB-1.118-M89, Interior Alkyd, Flat Finish.
   - .10 CAN/CGSB-1.119-M89, Primer-Sealer, Wall, Interior Latex Type.
   - .11 /CGSB-1.195-M90 Interior Semigloss Latex Paint.
   - .12 CAN/CGSB-1.198-92, Cementitious Primer (for Galvanized Surfaces).
   - .13 CAN/CGSB-1.202-92, Interior Low Gloss Alkyd Enamel.
   - .14 CAN/CGSB-1.209-93, Low Sheen Latex Interior Paint.
   - .15 CGSB 85-GP-1M-78, Painting (New) Exterior Wooden Surfaces.
   - .16 CGSB 85-GP-10M-79, Shop Painting Structural Steel.
   - .17 B 85-GP-16M-79, Painting Galvanized Steel.
   - .18 CGSB 85-GP-20M-79, Painting copper and Copper Alloys.
   - .19 CGSB 85-GP-32M-79, Painting Concrete Floors.
   - .20 CGSB 85-GP-33M-79, Painting Interior Plaster and Wallboard.
   - .21 CAN/CGSB-85.100-93, Painting.
3. National Fire Code of Canada.
4. Steel Structures Painting Council (SSPC).
   - .1 Systems and Specifications Manual 1989.
5. Architectural Painting Specifications Manual, Master Painters Institute (MPI).

1.4 SUBMITTALS

1. Submit product data and manufacturer’s installation/application instructions for each paint and coating product to be used in accordance with Section 01330 - Submittal Procedures.

2. Submit full records of all products used. List each product in relation to finish formula and include the following:
   .1 Finish formula designation.
   .2 Product type and use.
   .3 CGSB number.
   .4 Manufacturer's product number.
   .5 Colour numbers.
   .6 Manufacturer's Material Safety Data Sheets (MSDS).
   .7 Maximum VOC classification.
   .8 Ecologo certification.
   .9 MPI Environmentally Friendly Classification System Rating.

1.5 SAMPLES

1. Submit samples in accordance with Section 01330 - Submittal Procedures.
2. Submit 300 x 200 mm sample panels of each paint type specified.
3. Submit full range of available colours where colour availability is restricted.
4. Use 3 mm plate steel for finishes over metal surfaces. Use 12.5 mm birch plywood for finishes over wood surfaces. Use 50 mm concrete block for finishes over concrete or concrete masonry surfaces. Use 12.5 mm gypsum board for finishes over gypsum board and other smooth surfaces.
5. When approved, sample panels shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

1.6 QUALITY ASSURANCE

1. Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
2. Conform to latest MPI requirements for interior painting work including preparation and priming.
3. Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual “Approved Product” Listing and shall be from a single manufacturer of each system used.
4. Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.
5. Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Architect.
6. Standard of Acceptance:
   .1 Walls. No defects visible from a distance of 1000 mm at 90 degrees to surface.
   .2 Ceilings. No defects visible from floor at 45 degrees to surface when viewed using final lighting source.
   .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.7 QUALITY CONTROL

1. Provide mock-ups in accordance with Section 01450 - Quality Control.
2. When requested by Architect, prepare and paint designated surface, area, room or item (in each colour scheme) to requirement specified herein, with specified paint or coating show selected colours, gloss/sheen, textures and workmanship. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on site work.

1.8 DELIVERY STORAGE AND HANDLING

1. Deliver, store and handle materials in accordance with Section 01600 – Material and Equipment.
2. Deliver and store materials in original containers, sealed, with labels intact.
3. Indicate on containers or wrappings:
   .1 Manufacturer's name and address.
   .2 Type of paint or coating.
   .3 Compliance with applicable standard.
   .4 Colour number in accordance with established colour schedule.
4. Remove damaged, opened and rejected materials from site.
5. Provide and maintain dry, temperature controlled, secure storage.
6. Observe manufacturer's recommendations for storage and handling.
7. Store materials and supplies away from heat generating devices.
8. Store materials and equipment in a well ventilated area with temperature range 7° to 30° C.
9. Store temperature sensitive products above minimum temperature as recommended by manufacturer.
10. Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Architect. After completion of operations, return areas to clean condition to approval of Architect.
11. Provide minimum one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
12. Remove only in quantities required for same day use.
13. Fire Safety Requirements
   .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
   .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
14. Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials.

1.9 ENVIRONMENTAL REQUIREMENT

1. Environment Choice Program
   .1 Submit CSA Certification Reports that products proposed for use are certified under the Environmental Choice Program. Water based paints to be certified to ECP-07-89. Solvent based paints to be certified to ECP-12-89.
2. Ventilation:
   .1 Ventilate area of work as directed by Architect by use of approved portable supply and exhaust fans.
   .2 Ventilate enclosed spaces.
   .3 Provide continuous ventilation during and after application of paint. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of application of paint.
3. Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturers' recommendations.
4. Substrate and ambient temperature must be within limits prescribed in paint standard and by manufacturer to approval of Architect.
5. Maintain minimum substrate and ambient air temperature of 5° C for Alkyd and 7° C for latex paints. Maximum relative humidity 85%. Maintain supplemental heating until paint has cured sufficiently.
6. Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.
7. Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
8. Apply paint only when surface to be painted is dry, properly cured and adequately prepared.
9. Provide minimum 270 lx on surfaces to be painted.

1.10 SCHEDULING OF WORK

1. Submit work schedule for various stages of painting to Architect for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
2. Obtain written authorization from Architect for any changes in work schedule.

1.11 EXTRA MATERIALS

1. Submit maintenance materials in accordance with Section 01700 – Contract Closeout.
2. Submit one - four litres can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.
3. Deliver to Owner and store where directed.
4. Provide certificate signed by staff that extra materials have been received in order.

1.12 WASTE MANAGEMENT AND DISPOSAL

1. Separate and recycle waste materials whenever possible. Refer to Section 01355 for detail requirements.

2. Place materials defined as hazardous or toxic waste in designated containers.

3. Do not dispose of paints or solvents by pouring on the ground or through building or municipal sanitary system. Place in designated containers and ensure proper disposal in accordance with federal, provincial and municipal regulations.

4. Solvent based paints, which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner in accordance with hazardous waste regulations. Empty paint cans are to be dry prior to disposal or recycling.

2.0 **PRODUCTS**

2.1 MATERIALS

1. Qualified products: only paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
2. Paint materials for each coating formula to be products of a single manufacturer.
3. Low odour products. Whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour.
4. Paints, coatings, adhesives, solvents, cleaners lubricants and other fluids shall:
   .1 be non-flammable
   .2 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
   .3 be manufactured without compounds which contribute to smog in the lower atmosphere.
   .4 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
5. Water-borne surface coatings must be manufactured and transported in a manner that steps of process, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act. (CEPA).
6. Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead , cadmium, hexavalent chromium or their components.
7. Water-borne surface coatings must have a flash point of 61.0° C or greater.
8. Water borne surface coatings must be made by a process that does not release:
   .1 Matter in undiluted production plant effluent generating a “Biochemical Oxygen Demand” (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
   .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

2.2 COLOURS

1. Architect will provide Colour Schedule after contract award.
2. Selection of colours will be from manufacturer’s full range of colours.

3. Where specific products are available in a restricted range of colours, selection will be based on the limited range.

4. Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

1. Perform colour tinting operations prior to delivery of paint on site. On site tinting of painting materials is allowed only with Architect's written permission.

2. Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

3. Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

4. Thin paint for spraying in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide a copy of instructions to Architect.

5. Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS / SHEEN RATINGS

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

Gloss Level Category	**Units @ 60^{o}**	**Units @ 85^{o}**
G1-matte finish	0 to 5	Max 10
G2-velvet finish	0 to 10	10 to 35
G3-eggshall finish	10 - 25	10 - 35
G4-satin finish	20 - 35	min 35
G5-semi-gloss finish	35 - 70	
G6-gloss finish	70 - 85	
G7-high gloss finish	> 85	

2. Gloss level ratings of painted surfaces shall be as specified herein.

2.5 INTERIOR PAINT SYSTEMS

1. Concrete Vertical Surfaces: including horizontal soffit.
   1. INT 3.1A Latex G5 finish (over sealer)

2. Plaster and Gypsum Board: gypsum wallboard, drywall, "sheet rock type material", etc and textured finishes:
   1. INT 9.2A Latex G5 finish (over latex sealer) for walls throughout Pharmacy & Corridor.
   2. INT 9.2A Latex G4 finish (over latex sealer) for walls in Director's Office 420

3. INT 9.2A Latex G1 finish (over latex sealer) for ceilings.
4. INT 9.2F Epoxy-Modified Latex G5 finish (over latex sealer) for Mech. /Elec. Room.

3. Dressed Lumber: including doors, door and window frames casings, mouldings, etc.
   1. INT 6.3T Latex G5 finish (over latex primer).
4. Concrete Horizontal Surfaces: floors and stairs.
   1. INT 3.2B, Alkyd floor enamel, low gloss, finish
5. Structural Steel and Metal Fabrications: columns, beams, joists, etc.
   1. INT 5.1E Alkyd G5 finish
6. Galvanized Metal: doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.
   1. INT 5.3A Latex G5 finish.
7. Copper:
   1. INT 5.5A Alkyd G5 finish
8. Canvas and Cotton Coverings:
   1. INT 10.1B Alkyd G5 finish
9. Wood Paneling and casework: partitions, panels, shelving, millwork, etc.
   1. INT 6.4 C semi-transparent stain finish.

3.0 **EXECUTION**

3.1 GENERAL

1. Perform all painting operations for interior painting in accordance with MPI Painting Specification Manual except where specified otherwise.
2. Apply all paint materials in accordance with paint manufacturers written application instructions.

3.2 PREPARATION

1. Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, bath accessories and all other surface mounted fittings and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.
2. As painting operations progress, place "WET PAINT" signs in occupied areas to approval of Architect.

3.3 PROTECTION

1. Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed by Architect.
2. Cover or mask floors, windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.
3. Protect items that are permanently attached such as Fire Labels on doors and frames.
4. Protect factory finished products and equipment.
5. Protect passing pedestrians, building occupants and the general public in and about the building.

3.4 EXISTING CONDITIONS

1. Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Architect all damage, defects, unsatisfactory or unfavourable conditions before proceeding with work.
2. Investigate moisture content of surfaces to be painted and report findings to Architect. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
3. Maximum moisture content as follows:
    1. Plaster and wallboard: 12%.
    2. Masonry/Concrete: 12%.
    3. Concrete Block/Brick: 12%.
    4. Wood: 15%

3.5 CLEANING AND PREPARATION

1. Clean all surfaces to be painted as follows:
    1. Remove all dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
    2. Wash surfaces with biodegradable detergent and bleach and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
    3. Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
    4. Allow surfaces to drain completely and allow to dry thoroughly.
2. Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
3. Sand existing surfaces with intact, smooth, high gloss coatings to provide adequate adhesion for new finishes.
4. Where possible, prime all surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
    1. Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
    2. Apply wood filler to nail holes and cracks.
    3. Tint filler to match stains for stained woodwork.
5. Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible form a distance up to 1000 mm.
6. Clean new metal surfaces to be painted by: removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.
7. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air, or vacuum cleaning.
8. Touch up shop primer with primer as specified in applicable section. Touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
9. Do not apply paint until prepared surfaces have been accepted by Architect

3.6 APPLICATION

1. Method of application to be as approved by Architect. Apply paint by brush roller air sprayer airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
2. Brush and roller application.
    1. Apply paint in a uniform layer using brush and/or roller of types suitable for application.
    2. Work paint into cracks, crevices and corners.
    3. Brush and/or roll out runs and sags and over-sap marks. Rolled surfaces shall be free of roller tracking and heavy stipple.
    4. Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
    5. Remove runs, sags and brush marks from finished work and repaint.
3. Spray application.
    1. Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
    2. Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
    3. Apply paint in a uniform layer, with overlapping at edges of spray pattern.
    4. Brush out immediately all runs and sags.
    5. Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
4. Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Architect.
5. Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
6. Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
7. Sand and dust between each coat to remove visible defects.
8. Finish tops of cupboards, cabinets and projecting ledges, both above and below sight lines as specified for surrounding surfaces.
9. Finish closets and alcoves as specified for adjoining rooms.
10. Finish top, bottom, edges and cut outs of doors after fitting as specified for door surfaces.

3.7 MECHANICAL / ELECTRICAL EQUIPMENT

1. In finished areas: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment. Colour and texture to match adjacent surfaces, except as noted otherwise.
2. In boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
3. In other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

4. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
5. Do not paint over nameplates.
6. Keep sprinkler heads free of paint.
7. Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
8. Paint disconnect switches for fire alarm system and exit light systems in red enamel.
9. Paint all fire protection piping Red.
10. Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.8 FIELD QUALITY CONTROL

1. Field inspection of interior painting operations to be carried out by Architect.
2. Advice Architect when each applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
3. Co-operate with Architect and provide access to all areas of the work.

3.9 RESTORATION

1. Clean and re-install all hardware items that were removed before undertaken painting operations.
2. Remove protective coverings and warning signs as soon as practical after operations cease.
3. Remove paint splashing on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
4. Protect freshly completed surfaces from paint droppings and dust to approval of Architect. Avoid scuffing newly applied paint.
5. Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Architect

- END OF SECTION -

1.0 GENERAL

1.1 DESCRIPTION

.1 Comply with the General Instructions, Supplementary Conditions and the requirements of Division 1, and any supplements and/or addenda.

1.2 RELATED WORK SPECIFIED ELSEWHERE

.1	Framing and Sheathing	Section 06112
.2	Gypsum Board	Section 09250

1.3 SCOPE OF WORK

.1 Washroom Accessories

.2 High Speed Hand Dryer

2.0 PRODUCTS

2.1 MATERIALS

.1 Steel: new, medium grade steel, .031" (0.8mm) to CAN3-G40.21-M87, Grade 300W. Galvanized steel sheet, to ASTM A526M-85 commercial grade, stretcher levelled.

.2 Sheet Steel: to ASTM A525M-86 and A526M-85, galvanized (G90) stretcher levelled coating class.

.3 Aluminium: to CSA HA Series-M1980, temper T6.

.4 Welding Materials: to CSA W48 Series.

.5 Interior Primer: to CGSB 1-GP-40M.

.6 Exterior Primer: to CGSB 1-GP-132M.

.7 Zinc-rich Primer: minimum 85% pure electrolytic zinc in the dry film coating to CGSB 1-GP-181M.

.8 Bituminous Paint: to CGSB 1-GP-108M.

.9 Stainless Steel: Type 304.

2.2 FABRICATION

.1 Verify dimensions on the site before preparing drawings or proceeding with shop work. Fit various sections of the work, shop assemble and deliver to the site in the largest practical sections.

.2 Fabricate work true to dimensions, square, plumb and level. Accurately fit members with hairline joints. Secure intersecting members with adequate fasteners.

.3 Fabricate the finished work free from distortion and defects detrimental to appearance and performance.

.4 Welding shall be undertaken only by a fabricator fully approved by the Canadian Welding Bureau to the requirements of CSA W47.1-1983 and CSA W47.2-M1987 as may be applicable. File or grind exposed welds smooth and flush. Do not leave grinding marks.

.5 Weld connections where possible; where not possible, bolt connections or secure in an manner approved by the Consultant. Countersink exposed fastenings and cut off bolts flush with nuts; make inconspicuous.

.6 Provide fabricated metal work complete with components required for anchoring to concrete; bolted or welded to structural frames; standing free; or resting in frames or sockets in a safe and secure manner.

.7 After fabrication, thoroughly de-scale all metal to be primed. Remove any roughness and irregularities by grinding, clean with a wire brush, remove oil and grease from the surface and apply one shop coat of priming paint.

.8 Prime all interior ferrous metal work with one shop coat of primer.

.9 Galvanize items after fabrication where possible.

3.0 EXECUTION

3.1 INSTALLATION

.1 Install work true to dimensions, square, plumb and level. Accurately fit joints and intersecting members and with adequate fastenings.

.2 Install finished work free from distortion and defects detrimental to appearance and performance. Provide complete, with all components required for anchoring to concrete, bolting or welding to structural frames, standing free, or resting in frames or sockets in a safe and secure manner.

.3 Clean and make good, to the approval of the Consultant, surfaces soiled or otherwise damaged in connection with this work. Pay the cost of replacing finishes or materials that cannot be satisfactorily cleaned.

3.2 SCHEDULE OF ITEMS

.1 High Speed Hand Dryer

.1 Provide in quantity shown on drawings high speed hand dryer as following:

a) Manufacturer: American Dryer, Inc.
33067 Industrial Road, Livonia, MI 48150 USA

b) Model: ExtremeAir GXT Hand Dryer
Model GXT9-C, Chrome Finish; 120-240 V, 50/60 Hz

.2 Linen Roller Tower Dispenser

.1 Supply and install by Owner, GC to provide blocking in wall for mounting.

.3 Washroom Accessories

.1 Provide, in quantity required for each washrooms as per drawings. Where accessories normally stainless steel, complete unit shall be stainless steel (interior, box, backing, etc.). All surface mounted unless indicated otherwise.

.2 Accessories listed numbered to Bobrick Series. Watrous, Twin-Cee acceptable alternative of same style, quality as specified below

a) B1556 – 1830 Stainless Steel Frameless Mirror x 1

b) B-295 x 18 Stainless Steel Shelf x 1

c)	B-6827	Hat and Coat Hook x 2
d)	B-5806.99 x 30	Grab Bar with peened gripping surface x 1
e)	B-265	Double-roll Toilet Tissue Dispenser x 2

- END OF SECTION -

1. GENERAL REQUIREMENTS 15010

1. Comply with all requirements of Prime Consultant's specification.
2. This section applies to and is part of all sections of Division 15.
3. Mechanical contract price to include all necessary equipment, parts, labour and plant to ensure a complete and operational mechanical system as intended and depicted in the contract documents.
4. Contract document drawings are diagrammatic and approximate to scale. Do not scale these drawings, for exact dimensions refer to architectural and structural drawings.
5. Mechanical drawings and specifications establish scope of work only and are not detailed installation instructions. Follow manufacturer recommendations and adhere to all applicable code regulations and bylaws.
6. Connect to equipment specified in other sections, installed by other Contractors or the Owner.
7. The Consultant shall have the final say in matters of interpretation.

2. DEFINITIONS 15020

1. The term "Consultant" or "Owner's Representative" refers to Mechanical Consultant,
2. The term "Contractor" refers to the successful bidder engaged to perform the mechanical installation and all subtrades engaged by the Mechanical "Contractor".
3. The terms, "supply", "install", and "provide" shall mean to supply install and connect to ensure a fully functional mechanical system, tested and complete in every way. For work in the province of Manitoba, all companies and tradesmen shall hold required licenses under TSSA regulations.
4. "Drawings" and "Specifications" are complementary to each other. What is called for by one shall be binding to both. "Contract Documents" refers to both drawings and specifications.

3. GENERAL CONDITIONS 15050

1. Execute all mechanical sections by skilled and qualified tradesmen regularly employed in this type of installation. All work on heating systems shall be by Contractors registered for heating system work by the Department of Labour. Contractor to provide proof of compliance upon demand. Tradesmen to provide proof of registered status upon demand.
2. Provide all necessary labour, materials and equipment to complete the work shown on the drawings and described in the specifications.
3. Apply for and pay for all required permits, licenses, inspections and fees necessary for a complete mechanical system.
4. In the event of conflict between contract documents and codes the more stringent requirement shall be adhered to.
5. All work shall be guaranteed for one year from date of substantial acceptance as determined by the Prime Consultant. Submit documentation identifying additional equipment warranty coverage and time frames.
6. Mechanical Contractor is responsible to co-ordinate all aspects of the mechanical installation with all other trades. There shall be no change notices issued due to routing conflicts amongst trades. Alter the location of ducts or pipes at the direction of the engineer without charge to the

owner, provided the change is made before installation and does not necessitate additional materials.

7. Tender quotations shall be based on the use of specified manufacturers, unless approval for the use of equal manufacturers is obtained from the engineer (seven) 7 days prior to submission of tenders. Alternate manufacturers may be quoted as an increase or decrease amount to the tender price, without prior approval of the engineer. The use of an equal or alternate manufacturer shall in no way relieve the mechanical contractor from the responsibility of providing all work that may be required by reason of different space, weight, electrical, or other requirements from that of the specified manufacturer.
8. The Mechanical Contractor is responsible to carefully examine conditions at the intended place of work. Verify all existing services and connection points. Verify all access openings to permit installation of new equipment.
9. Cutting of openings not requiring structural modifications shall be the responsibility of the Mechanical Contractor and associated sub-trades. Opening sizes to be kept to a minimum. Patching of openings shall be the responsibility of the trades normally engaged in installing the finishing materials (ie. Drywall, brick, etc.) Mechanical Contractor to confirm and co-ordinate all cutting and patching requirements with General Contractor.
10. Mechanical Contractor shall submit six (6) sets of shop drawings for review by the Consultant prior to commencing work. Shop drawings shall be specific to the equipment and materials for this project. Changes to location and arrangement shall be reviewed prior to installation. Review of shop drawings by the Consultant is for the sole purpose of ascertaining conformance to design intent. The Mechanical Contractor retains responsibility for all aspects of installation, performance and co-ordination.
11. Mechanical Contractor shall maintain accurate “as-built” drawings on site and shall present for review at each site review. Submit these record drawings for review at the completion of the project.
12. Use only new materials under this contract unless otherwise noted on the drawings.
13. Engineering Site Reviews: Contractor’s work shall be periodically reviewed by the Consultant for determining general quality of installation. Guidance will be offered as to interpretation of contract documents and to assist in performing the mechanical installation. Inspections, reviews and directives issued in no way relieve the Contractor, his agents, employees or subtrades from contractual obligations, conformance to codes or safe and recognized practices.
14. Operating and Maintenance Manuals, at the completion of work submit three (3) hard covered loose-leaf binders showing all major components divided by trade sections. Manuals shall be complete with all instructions for operation, maintenance and replacement parts as required. Include performance curves, detailed drawings, part lists, supplier information and any other pertinent data. Include copies of reviewed shop drawings, Consultant contact information, Contractor and Sub-contractor information. Include copies of valve tag lists, all inspection certificates, and balancing reports. Mechanical Contractor shall provide to owners representatives operating instructions to ensure a thorough understanding of the equipment and its operation.
15. Provide one set of special tools required to service equipment as recommended by manufacturer.
16. Provide one set of spare filters for each filter bank.

17. Tag all major zone and shut off valves with 38mm (1 ½") diameter brass tags. Index and list valves, insert list in each O & M Manual also frame and mount copy of list in a conspicuous area of the mechanical Room.
18. Identify all equipment with black lamacoid tags 100mm x 25mm (4"x1") with raised white lettering. Affix tags to equipment. Equipment names and number to match those listed on contract documents.
19. Identify all new piping within building installed in this contract showing service, pipe size, and flow direction. Use capital letters using either fire resistant high gloss interior enamel paint or waterproof, heat resistant plastic marker tags (similar to: W.H. Brady identification tapes, bands, markers.) Identify at maximum of every 50 ft. and at least once in each room. Locate and size lettering such that it can be seen from floor.
20. Wherever pipes of dis-similar metals are joined the piping systems shall be protected and isolated by use of dielectric unions or brass valves.
21. Provide and install union or flange connections at all equipment and devices to allow for ease of service or future replacement.
22. Piping Systems:

1. Sanitary DWV:	cast iron and copper DWV PVC where approved
2. Domestic Water:	Type L with wrought copper fittings and lead free solder (Third Party Certified)
3. Water Services:	Ductile Iron or PVC where approved Soft copper Type K

23. Valves:
    1. All valves shall have a minimum certified rating of 150 psi. Ball valves and butterfly valves may be used in place of gate valves if they meet the specified rating standard.

       Standard of acceptance: Jenkins, Crane, Toyo, Neuman Hattersly
    2. All drain down valves shall be complete with cap and chain.
    3. Install ¼ turn ball valves prior to all pressure gauge devices.
    4. All gas system valves shall be CGA approved for application.
    5. Ball valves shall be used for isolation on systems 50mm (2") and under.
24. Hangers and Supports:
    1. Provide adjustable clevis hangers equal to pipe size and of same material as piping system.
    2. Use only factory made inserts, coach screw rods, c-clamps, beam clamps and expansion shields rated for the intended load.
    3. "Caddy" clip or tension clip rod supports are not allowed on this project.
    4. Duct hangers shall be rod or strap 2 gauges heavier than duct.

Use the following rod diameter and spacing schedule to establish minimum hanging standards for horizontal piping:

Steel Pipe

Size	Rod Diameter	Maximum Spacing
1-1/4" (32 mm) and smaller	3/8" (10 mm)	3'-0" (900 mm)
1-1/2" (38 mm) and 2" (50 mm)	3/8" (10 mm)	3'-0" (900 mm)
2-1/2" (65 mm) and 3" (75 mm)	1/2" (12 mm)	12'-0" (3600 mm)
4" (100 mm) and 5" (125 mm)	5/8" (19 mm)	12'-0" (3600 mm)
6" (150 mm)	3/4" (19 mm)	12'-0" (3600 mm)

Copper Pipe

Size	Rod Diameter	Maximum Spacing
2-1/2" (65 mm) and smaller	3/8" (10 mm)	6'-0" (1800 mm)

25. Provide and install sleeves of suitable material where piping and duct systems pass through any and all separations.
26. Supply and install thermostats and gauges at all major pieces of equipment and where indicated on the drawings. (Note PSN-B Snubbers required at all gauges.) Mount all gauges and thermostats vertically and place so that ease of reading is ensured. Pressure and temperature ranges shall be suitable for the application.
27. Fire stopping: fire stop all pipe and duct penetrations through rated separations.
28. Install mechanical systems in a workmanlike manner, neat in appearance and to function properly to the satisfaction of the Consultant. The Mechanical Contractor shall install heating, air conditioning, ventilation, and plumbing systems in complete accordance with the recommendations of the Ashrae, National Warm Air Standards, SMACNA latest edition duct standards, and local plumbing codes.
29. Repair or replace all work unsatisfactory to the Consultant at no extra cost.
30. Ceiling mounted components shall be installed as per reflected ceiling plan. Devices installed in "T-bar" (removable) ceiling grids shall be installed tight to grid. Extra T-bar by ceiling grid supplier, coordinated by the Mechanical Contractor.
31. Primer paint all miscellaneous metal supports channels and angle iron prior to installation.

32. Pipe all discharge from relief valves and equipment drains to nearest floor drain or suitable receptacle.
33. Install all valves, strainers, equipment, specialties, filters and the like to permit ease of operation and full access.
34. Acceptable joining systems include mechanical joints (sanitary) soldering, silver soldering, threaded joints, welding, socket welding, grooved Victaulic (black) and grooved copper Victaulic.

    NOTE: Tee drilling, flexible tubing and Press-fit systems are not acceptable on this project.
35. All work shall comply in every respect with all local and provincial by-laws and codes, which shall be considered part of this specification.
36. All wiring and supply and installation of disconnect switches for equipment specified herein shall be performed by the Electrical Contractor, unless otherwise noted. Co-ordinate the electrical requirements of all mechanical equipment with Division 16 Electrical.
37. Supply and install rated access doors at all service points for mechanical equipment. Indicate on "as-built drawings"" the location of all access doors. Arrange with drywaller for special framing required for access doors in drywall surfaces at no extra cost.
38. Test all systems to 1 ½ times working pressure for a minimum of two hours. All tests shall be recorded and independently witnessed. Submit recorded data for Consultant's review and include in O & M Manuals.
39. Provide vibration isolation as manufactured by Vibro-Acoustics; Vibron, KM Industries, or Air Master for all pieces of equipment that may cause objectionable vibration or noise.
40. Supply and install flexible duct connections at all air-handling equipment.
41. Scheduling of all work shall be arranged with the owner, and the owner shall be notified and his approval obtained prior to shutting off existing services for purposes of connecting new work. Work within the building may have to be performed during non-regular working hours and must conform to work rules of the building as directed by the owner.
42. Prior to submitting tender price, contractor shall examine the site and conditions affecting work, method of connection and location of all services involved under this contract. Failure to make this visit in no way alleviates the mechanical contractor from responsibility for completing the mechanical work of this contract in a workmanlike manner. No allowance will be made after contract award for any expense incurred through a failure to make this examination and investigation.
43. The contractor shall at his own expense, provide temporary heating as required for the proper progress of the work.
44. Pipe hangers where required shall be Grinnell Fig. 65 for steel pipe and Fig. 117 expansion case set in holes drilled in concrete or attached to Fig. 225 or 227 clamp attached to floor joist and roof joist. For insulated piping, provide protection Fig. 167 saddles size hanger to accommodate insulation where applied. (No perforated type strap hangers are to be used as any form of support method.)
45. Verify sizes, invert elevations, and locations of all services prior to any commencement of any installation work.
46. Hoisting of all mechanical equipment shall be by the Mechanical Contractor.

47. Assume full responsibility for laying out all work and ensuring that no damage is caused to the owner's equipment and premise due to improper location and execution of work in this contract. Protect and maintain all work until work has been completed and accepted by the owner. Store all materials as required, and clean up refuse caused by all work.
48. Prior to requesting any substantial completion inspection, all aspects of the mechanical systems shall be complete and operational. Air and water balance shall be complete along with valve and equipment identification, equipment start-ups, O & M Manuals, and record drawings.

4. INSULATION 15180

1. Supply and install 25mm (1") thick piping insulation on all domestic cold, hot, and recirculation piping complete with vapour barrier. (Branch runouts to fixtures will be insulated.)
2. Insulate all plumbing vents with 25mm (1") thick rigid pipe insulation with vapour barrier 3m (10') back from roof penetration or from point of penetration to conditioned space.
3. Provide 1" thick flexible foil back insulation on all supply air ductwork within ceiling spaces where ceiling space is not used for return air plenum.
4. Insulate entirely all exhaust ductwork with 25mm (1") insulation complete with vapour barrier from exhaust fan outlet connection up to roof/wall penetration roof jack location.
5. Insulate all fresh air ductwork with 50mm (2") insulation complete with vapour barrier jacket.
6. All piping shall be insulated in exposed areas. Exposed insulation in all areas including Mechanical Rooms and Electrical Rooms shall be canvas covered.
7. Supply ducts exposed to the elements shall be insulated with 100mm (4") complete with metal jacket cover and weatherproof finish.

5. AIR BALANCING 15250

8. Prime Mechanical Contractor to engage a recognized testing and balancing firm for this work.
9. Test all fire dampers, stops and flaps to industry standards. Tag each device listing company information and testing information. Successful fire damper tests and certification shall be provided to the Consultant prior to certification for occupancy.
10. Balance all new and modified air systems to +/- 10% of design. Balance all supply air outlets and main ducts conveying 25% or more of system volume. Allow to replace belts and sheaves on new and existing equipment to meet air balance volumes.
11. Set maximum and minimum flows for all new air handling equipment.
12. Arrange with Mechanical Contractor to have any necessary modifications performed at no extra cost to Owner.
13. Provide three (3) written reports consisting of all testing and balancing data, system schematics showing device locations and air flows.

6. PLUMBING 15400

1. Supply and install fixtures indicated under contract documents to provide a complete and functional plumbing system. Provide complete functional plumbing system comprised of domestic water piping, vents, and sanitary drainage piping, etc. Connect all new building plumbing piping services to existing building services. Confirm and co-ordinate exact service connection locations, invert elevations, sizes, etc. on site with existing site conditions.

2. Use only lead free solders when joining piping components. Use 95.5 tin antinoy brazing solder on all hot and cold water piping. Use non-corrosive non-leaded flux.
3. All valves and fixtures shall be of one manufacturer. Standard of Acceptance Toyo (Red and White).
4. Provide access doors at all concealed cleanouts, valves and water hammer arrestors.
5. Install water hammer arrestors at each group of fixtures.
6. All water piping above ground inside building shall be type L hard copper – 3rd party certified.
7. Drains and vent piping below ground inside building shall be DWV copper, cast iron or PVC plastic pipe (where applicable by code). Joints shall be soldered for copper and solvent cement for PVC pipe.
8. Fixtures shall be white and complete with chrome trim, fixture stops shall be screwdriver type where exposed, wheel handle where concealed. Fixture List as per schedules.
9. Drains and vent piping below ground outside building shall be cast iron class 4000, or SDR-35 PVC plastic. Fittings shall be mechanical joist for cast iron or solvent cement for PVC.
10. 10. Mechanical Contractor shall verify on site all connections points to existing services. Co-ordinate all new piping run routing on site with mechanical engineer or owner's representative.
11. Mechanical Contractor shall allow for in tender quotation any additional labour, materials, etc. deemed necessary due to exact site conditions which have not been reflected in mechanical drawing or in mechanical specification. Notify engineer of all discrepancies prior to tender close.
12. On completion, all piping systems shall be cleaned and flushed out to remove any foreign material in the piping.
13. Mechanical Contractor shall perform all required plumbing service hook ups to equipment being provided by others.
14. All plumbing fixtures, domestic hot water tank, etc. for building areas are all being supplied and installed by Plumbing Contractor including all plumbing service connection hook ups to equipment.

7. FIRE PROTECTION 15500

1. Provide fire extinguishers within washroom area and electrical room. Provide one 10 lb multi-purpose type fire extinguishers c/w wall mounting bracket in each washroom area and electrical room. Provide one additional 10 lb CD carbon dioxide fire extinguishers c/w wall mounting bracket within electrical room. All installations as per NFPA codes and regulations.

8. HEATING AND COOLING 15700

1. Supply and install all heating equipment, devices, etc. for a complete and fully operational system.
2. For equipment start-up follow manufacturer's instructions and have manufacturers representative present to certify the installation and procedures. Provide manufacturer's certification to O & M Manuals.
3. Mount all devices to permit ease of operation, service and replacement.

4. Maintain all required clearances as indicated on manufacturer's cut sheets and as required by code authority having jurisdiction.
5. Install all automatic control valves as supplied by Controls Division 15900.

9. VENTILATION 15800

1. Supply and install a complete ventilation system as indicated on the drawings and as required by local codes and authorities. Do all work to latest SMACNA Standards for applicable duct velocity and installation standards and requirements. Provide supply air, exhaust air, and return air duct systems from air handling fan coil units, exhaust fans, etc. as shown.
2. System shall include all ducts, fire dampers, transfer air openings, fans, balance dampers, grilles, diffusers and turning vanes indicated on drawings and as required by code.
3. Assist with air balancing as required (scaffolds ladders, operation, etc.).
4. Provide and install all automatic dampers as supplied by Division 15900 Controls.
5. Provide access doors on both sides of fire dampers, control dampers and all coils. Access doors constructed of 22-gauge material with flat iron framing complete with sash lock latching.
6. Provide acoustic insulation where indicated on drawings 1" thick, 3.0 lbs./ft. density fiberglass with Neoprene coating. Note: 2" thick for outdoor installation (Increase duct sizes accordingly).
7. Provide ULC labelled fire dampers and flaps where indicated on drawings and at all rated separations.
8. Provide splitter and quadrant dampers as indicated on drawings or as necessary to balance system and reduce objectionable noise. Balancing dampers shall be constructed from galvanized steel 2 gauges heavier than the ductwork in which they are installed c/w locking quadrant and indicating device.
9. Provide flexible connections at all air handling equipment.
10. Provide and install drip pans constructed of galvanized iron with soldered joints lined with mastic as required by drawings and equipment schedule.
11. Protect and keep closed open ends of duct systems while under construction to prevent dust and debris penetration.
12. Provide baffles to reduce objectionable noise as directed by the Consultant at no additional cost.
13. Seal all joints in duct system with water based approved sealant. All new ductwork shall be sealed using duct bond II high pressure, non-toxic duct sealer throughout all seams and joints.
14. This contractor shall supply and install all ductwork as shown including appurtenances, hangers, dampers, turning vanes, etc. all exposed round ductwork shall be round spiral conduit constructed of zinc coated steel. Acceptable product: United Sheet Metal Co. Shop fabricated ductwork and fittings constructed in a manner similar to the factory type specified will be accepted.

Conduit Size	Gauge of Metal
8" and smaller	26
9" to 22"	24
24" to 36"	22

Rectangular ductwork shall be constructed from galvanized sheet metal of the following U.S. standard gauges.

Ducts up to 12" on longest dimension 26 GA.
Ducts 13" to 28" on longest dimension 24 GA.
Ducts 29" to 48" on longest dimension 22 GA.

10. CONTROLS

1. All controls shall be supplied by this section. Provide all wiring diagrams for line voltage wiring by Division 16 Electrical Contractor. Coordinate all requirements of Div. 16 with Electrical Contractor prior to submitting bid.
2. All thermostats in exposed areas shall be complete with lockable Lexcan vandal resistant guards. Thermostats shall be 7-day programmable with night set back functions, sub-bases and 3-hour override function. Thermostat to be complete with remote sensor device c/w lockable vandalproof metal cover.
3. Provide all control dampers for installation by Ventilation Contractor 15800.
4. System shall be complete with all necessary wiring, interlocks, devices and software necessary to ensure a complete and operational system.
5. Set, operate and co-ordinate all devices for fully functional system.
6. All wiring to meet Div.16 specification requirements as well as all applicable codes and by-laws.
7. Refer to drawings for sequence of operations of each system.

MECHANICAL EQUIPMENT

A. DOMESTIC HOT WATER HEATER & TANK SCHEDULE

Domestic hot water heater HWT-1 shall be Rheem/Ruud or approved equal model RE4 @ 3.3 imp. Gallons storage capacity c/w 1.5 kw electric heater, T & P relief valve piped to drain to funnel floor drain.

B. PLUMBING FIXTURE SCHEDULE

P-1 Water Closet

1. Crane 3-131 Cavalier wall hung vitreous china, regular rim, siphon jet c/w chek-drip tank, vandalproof lid.
2. Crane C-3017 3/8" c.p. angle supply pipe with screwdriver stop.
3. Zurn model Z-1203 fixture carrier.

P-2 Wall Hung Lavatory

1. Crane 1-208 Norwich 20x18 wall hung lavatory basin with supply opening on 4" centres and front overflow.
2. Delta Model 591T0225 electronic eye flush device (electric) c/w mixing valve mounted in Electrical Room.
3. Offset waste open grid assembly with 1 1/4" tailpipe.
4. Cambridge Brass 1 1/4" cast brass adjustable P trap with deep flange and C.O, chrome plated finish.
5. 1 pair of 3/8" angle C.P. supplies and R-19 C.P. angle stops, C.P. escutcheons.
6. Zurn wall mounted concealed arm carrier.
7. Water filler faucet shall be Delta model W 6685 wall mount bracket c/w Delta model gooseneck & Delta model gooseneck & Delta model W6629 valve with index button; Self-closing.Gooseneck spout to be centred on lavatory.

P-3 Floor Drain

1. Zurn ZN-211B5, lacquered cast iron floor drain with type 'A' model bronze strainer

P-4 Funnel Floor Drain

1. Zurn ZN-211BF5 lacquered cast iron floor drain with oval funnel.

C. EXHAUST FAN SCHEDULE

Exhaust fan EF-1 shall be Greenheck or approved equal Model SP-7-00QD @ 95 CFM, 1000 RPM, 5/8" E.S.P. c/w 80 watt motor, motion detector switch control, integral grille, insulated exhaust ductwork, roof jack & two sets of backdraft dampers – one @ fan outlet & one @ roof jack (2 zones).

D. FAN COIL UNIT SCHEDULE

Fan coil unit FCP-1 shall be Lennox First Co. HXB-19, @ 600 cfm, c/w 1/8 hp. motor, 1/2" E.S.P., c/w 8 kw electric heating coil, plenum enclosure, heating/cooling programmable thermostat c/w sub-base. Thermostat c/w remote sensor device mounted within lockable vandalproof metal cover. (Thermostat mounted within electrical room – remote sensor mounted within washroom area.)

E. GRILLE SCHEDULE

Based on E.H. Price or approved equal. All final colour selections to be confirmed with architect.

Type A – E.H. Price model CL-272S sidewall supply c/w balance damper
Type B – E.H. Price model F530 sidewall transfer air
Type C – E.H. Price model wire mesh transfer air c/w metal frame border

Louvers shall be Air-O-Lite model K609 c/w birdscreen.

- END OF SECTION -

1.0 GENERAL CONDITIONS

1.1 GENERAL

.1 The specification covering the General Conditions of the Contract, General Specifications, and all associated sections form an integral part of this specification and shall be read in conjunction herewith.

.2 Electrical installation shall be in accordance with the current edition of the Canadian Electrical Code CSA 22.1, local jurisdiction having authority and/or City of Winnipeg and other codes, rules and regulations. Supply material and labor required to meet the requirements of these codes, rules and regulations even though the work is not shown on the drawings or mentioned in the specifications. Where the electrical installation calls for better quality materials or construction than the minimum of these codes, rules and regulations, the electrical installation shall be as shown on the drawings and as specified.

.3 Electrical installation shall be in accordance with the requirements of the electrical supply authority and local inspection authority.

.4 Electrical contractor to be responsible for making all arrangements with hydro utility company for incoming service. This shall include but not necessarily be limited to submitting the utility electrical service application on behalf of the owner (as per the electrical loads shown on the plans and specifications), coordinating the location of the service as per the preferred service location on the plans, confirming available fault current requirements for main distribution and supplying suitable equipment, and timely submission of required information to suit the construction schedule to ensure power is available to suit owner's requirements. The electrical consultant shall provide AutoCAD drawings to the electrical contractor (upon written request) when required for submission to electrical utility company.

1.2 SCOPE

.1 Provide all materials, labor, plant and equipment required for a complete and working installation and as shown and detailed on drawings.

.2 The electrical installation shall be in accordance with the current edition of the Canadian Electrical Code and local regulations.

.3 Obtain all permits, approvals and pay all fees required for installation. Electrical contractor shall obtain and provide a copy of the electrical inspection certificate from authority having jurisdiction and provide a copy to consultant.

.4 All equipment supplied under this contract shall be new and be CSA approved.

.5 Arrange for, and coordinate, rough-in and final inspections with the Inspection Authority having jurisdiction, Consultants and Local Authorities.

1.3 WORK INCLUDED

.1 Refer to detailed Scope of Work as detailed on drawings.

.2 Provide all power and miscellaneous wiring and make all connections as indicated.

.3 Provide all lighting and control equipment as indicated and make all connections.

1.4 EXAMINATION

.1 Prior to submitting a tender, the Electrical Contractor shall examine all drawings and specifications of other disciplines to ensure that the work under this Contract can be satisfactorily carried out. Report any discrepancies to the Consultant prior to installation of equipment.

.2 Prior to submitting a tender, the Electrical Contractor shall examine the site, local conditions and all existing apparatus if any is to be re-used and verify that the condition of this equipment is suitable for its intended use in the new construction. Report any discrepancies to the Consultant prior to commencing any work. Claims for extra payments resulting from conditions which could be reasonably foreseen from examination of the documents and/or site will not be recognized.

.3 Refer to General Conditions for instruction regarding mandatory site visit during the tender period.

1.5 SUPERVISION

.1 Supervise the work at all times through a responsible and competent supervisor.

.2 Full cooperation shall be shown with other trades to facilitate installations and to avoid delays in carrying out the work.

1.6 ACCURACY OF DATA

.1 Drawings are schematic; exact locations, distances, levels and other dimensions shall be governed by the building as constructed.

.2 Outlets or equipment shall be moved to any point within a 10 foot radius when relocation is requested by the Consultant before the work has been substantially completed, without additional cost.

.3 Branch circuit wiring shall be installed with circuits arranged exactly as shown on drawings. Conduit and cable runs may be modified to suit installation.

1.7 APPROVAL OF MATERIAL

.1 Request for approval of electrical equipment as equals or alternates to that specified shall be submitted to the Consultant complete with performance specifications. Samples shall be provided on request.

.2 Bidders shall submit a tender based on the specified materials and equipment only.

.3 Bidders may submit a tender based on equivalent materials and equipment only if such items have been approved as equals by the Consultant.

.4 Bidders may submit, with their tender, an alternate price based on alternate materials and equipment only if such items have been approved as alternate by the Consultant.

1.8 SHOP DRAWINGS

.1 Submit electronic legible PDF format of shop drawings of electrical equipment to the Consultant for review. Send shop drawings to: info@sumitech.ca. Fabrication of equipment shall not commence until shop drawings of such equipment have been reviewed by the Consultant. One set shall be submitted with Local Inspection Department approval where required.

.2 Include details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material. Where applicable, include wiring, single line and schematic diagrams.

.3 Submit shop drawings of service equipment to Supply Authority.

1.9 PROJECT RECORD DOCUMENTS

.1 Keep a record set of drawings on the site at all times recording any changes that may occur.

.2 Project record documents shall be transferred to electronic AutoCAD file format. The Electrical Contractor shall be responsible for the production of electrical "as-constructed" drawings which shall provide a complete and accurate record of the actual electrical installation. The Electrical Contractor shall stamp, sign and date these drawings as "Record Drawings". Submit one disk and hard copy for final review and submission to the Consultant upon completion. Record documents that are incomplete shall be returned to the Electrical Contractor for correction. The Consultant shall recommend a suitable deficiency holdback until such time as the Record Drawings are submitted in an acceptable form.

.3 Indicate on the record drawings the exact location of underground services referenced to established survey benchmarks.

1.10 OPERATION AND MAINTENANCE MANUALS

.1 Provide three (3) bound copies of catalogue sheets and maintenance materials for complete installation. Submit to Consultant for review upon completion of project. Include Certificate of Electrical Inspection in manuals. Manuals that are incomplete shall be returned to the Electrical Contractor for completion. Completed manuals shall be submitted, to the satisfaction of the Consultant, before final payment may be considered to be due.

.2 Include details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of the installation.

.3 Include technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items and parts lists. Advertising or sales literature will not be acceptable.

.4 Include wiring and schematic diagrams and breaker curves.

.5 Include names and addresses of local suppliers for items included in Maintenance Manuals.

.6 Provide an auto-cad disc copy and 3 paper hard copies of the contact drawings for record “as-builts” drawings revised as required to show any deviations of layouts from that originally shown.

1.11 TESTS

.1 The electrical installation shall be completely tested demonstrating that the equipment and systems installed perform in the manner intended.

.2 Conduct and pay for tests including, but not limited to, the following systems:

a) Power Distribution system.
b) Circuits originating from branch distribution panels.
c) Grounding systems.

.3 Carry out tests in presence of Consultant where directed.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.5 Check resistance to ground before energizing.

1.12 VOLTAGE RATINGS

.1 Operating voltages to CAN3-C235-83.

.2 Motors, electrical heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment shall operate in extreme operating conditions established in above standard without damage to equipment.

1.13 INSPECTION

.1 Furnish a Certificate of Acceptance from the Inspection Authorities on completion of work. Copies of certificate shall be included in the Maintenance Manuals. This Certificate shall be submitted before final payment may be considered to be due.

.2 During the course of the project construction, the Consultant will carry out periodic site reviews and prepare a deficiency list for remedial action by the Electrical Contractor.

1.14 CARE, OPERATION AND START-UP

.1 Instruct the Owner's operating personnel in the operation, care and maintenance of equipment. Arrangement of such instructional sessions shall be done at a time convenient to the Owner.

.2 Arrange and pay for services of Manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.

.3 Provide these services for such a period and for as many visits as necessary to put equipment into operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.15 FINISHES

.1 Paint indoor switchgear and distribution enclosures light grey to EEMAC-2Y-1. Outdoor electrical equipment enclosures shall be painted "equipment green" to EEMAC-2Y-1.

.2 Clean and touch up surfaces of shop-painted, scratched or marred during shipment or installation, to match original paint.

.3 Clean, prime and paint exposed hangers, racks, fastenings to prevent rusting.

1.16 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with lamicoid nameplates.

.2 Identify circuit numbers on receptacles with "BRADY" Globemark tape.

.3 Provide lamicoid nameplates, 1/8" thick plastic engraving sheet, black with white core, mechanically attached (screwed or riveted) unless otherwise specified. Sizes 4" wide x 3" high.

.4 Wording on nameplates shall be approved prior to manufacture. Submit schedule of nameplates and wording.

.5 Allow for average of thirty-five (35) letters per nameplate.

.6 Identification shall be English.

.7 Nameplates for terminal cabinets and junction boxes shall indicate system and/or voltage characteristics.

.8 Use red nameplates with white lettering for emergency power.

1.17 LOCATIONS OF OUTLETS

.1 Outlet locations shall be reviewed on site with Owner and Consultant prior to installation.

.2 Do not install outlets back-to-back in wall; allow minimum 16" horizontal clearance between boxes.

.3 Drawings are schematic only and do not indicate all architectural or structural elements.

.4 Change location of outlets at no extra cost or credit, providing distance does not exceed 10'-0" and information is provided prior to rough-in.

.5 Locate light switches on latch side of doors.

1.18 MOUNTING

.1 Mounting height of equipment is from the finished floor to the centerline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not indicated, verify with Consultant before proceeding with installation.

.3 Install electrical equipment at the following heights unless indicated or directed otherwise (to center of outlet).

a) General receptacles shall be mounted at 16" in vertical orientation.
b) Panelboards: 78" to top.

1.19 PROTECTION

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark live parts "LIVE (___) VOLTS", with appropriate voltage in English.

.3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision.

.4 Provide wire guards for all electrical equipment (occupancy sensor, motion sensors) in areas subject to damage.

1.20 FIREPROOFING

.1 Where cables or conduits pass through floors, block or concrete walls and fire-rated walls, seal openings with fire-stopping material with intumescent properties.

.2 Fire proofing of electrical cables, conduits, trays, etc. passing through fire barriers shall conform to local codes and inspection authorities.

.3 Fire Stop materials shall be asbestos free and have been tested in accordance with ASTM E-84 and E-814 and ULC-1479,

.4 Approved Manufacturer: Nelson Firestop Products or Spec Seal.

1.21 CLEANING

.1 Do final cleaning in accordance with General Conditions.

.2 At time of final cleaning, clean lighting reflectors, lenses, and other lighting surfaces that have been exposed to construction dirt and dust.

.3 Clean interiors of all panels.

1.22 DELIVERY, STORAGE AND HANDLING

.1 Co-ordinate all deliveries with on site supervisor prior to delivery.

.2 Deliver all materials to site in an orderly fashion.

.3 Store all materials in a clean and dry place, secure from vandalism or theft. All materials shall be left in shipping containers until required for use.

.4 Provide additional protection such as tarps, padding, wood skids, etc. where such is required to ensure protection of equipment.

1.23 SPARE PARTS

.1 Owner/Consultant to review and confirm spare breakers are provided as indicated on drawings upon completion of work.

1.24 REQUEST FOR CHANGE

.1 All quotations in response to request for change shall be submitted complete with an itemized cost breakdown of all materials and labor required for the change. Consultant reserves the right to review costing using accepted Contractor's Pricing Standards.

1.25 GROUNDING

.1 The entire installation shall be grounded in accordance with the Canadian Electrical Code.

1.26 WORKMANSHIP

.1 Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to the satisfaction of the Consultant. Install conduit and cable runs parallel and perpendicular to building lines.

.2 Install neatly and group to present a tidy appearance. Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with adequate clearances and accessibility.

.3 Include, in the work, all requirements shown on the shop drawings or manufacturer's installation instructions. Replace work unsatisfactory to the Consultant without extra cost.

.4 All conduit and cables must be clipped to structure by means of anchors or supported by Unistrut hangers as close to U/S as possible. Tye wraps for wire hanging or fastening is not acceptable, unless pre-authorized by Owner and acceptable to Canadian Electrical Code. Perforated strapping is also unacceptable.

1.27 CASH ALLOWANCES

.1 Refer to General Conditions.

1.28 GUARANTEE

.1 The satisfactory operation of all work shall be guaranteed for a period of 12 calendar months after final acceptance of work.

2.0 MATERIALS AND INSTALLATION

2.1 WIRING METHODS

.1 Conduits -

a) Rigid galvanized steel threaded conduit size as indicated.
b) Electrical metallic tubing (EMT) size as indicated.
c) Rigid PVC conduit size as indicated.
d) Flexible metal conduit (Flex) size as indicated.
e) Liquid-tite flexible metal conduit (Seal-tite) size as indicated.

.2 Conduit fastenings -

a) Two hole steel straps to secure surface conduits.
b) Beam clamps to secure conduits to exposed steel work.
c) Uni-strut channel type support for two or more conduits, surface or suspended.
d) 4 3/8" diameter threaded rods to support suspended channels.

.3 Conduit fittings -

a) Fittings manufactured for use with conduit specified.
b) Manufactured elbows are required for conduits 2 ½" or larger.
c) Die cast set screw connectors and couplings. Insulated throat liners on connectors.
d) Raintight connectors with O-rings for weatherproof or sprinklerproof applications.
e) Expansion fittings with internal bonding jumper where required.

.4 Install conduits to conserve head room in exposed locations and cause minimum interference in spaces through which they pass. Conceal conduits, wherever possible, except in mechanical and service rooms. Surface conduit installations in finished areas shall be reviewed by Consultant and Owner prior to installation.

.5 Wiring home runs to panels and main branch wiring in ceiling spaces shall be run in conduit. Wiring drops from conduit systems into boxes for wiring devices in steel stud partitions may be wired in AC-90. Drops may not exceed 6 feet from box to partition.

.6 Use flexible metal conduit for transformers, motors or other equipment subject to vibration. Provide separate insulated grounding conductor within flexible conduit.

.7 Use rigid PVC conduit for underground services and installations. Provide separate insulated grounding conductor within PVC conduit.

.8 Bend conduit cold and replace conduit if kinked or flattened more than one-tenth of its original diameter. Dry conduits out before installing wire. Install polypropylene fish cord in empty conduits.

.9 Install two 1" spare conduits up to ceiling space above surface or recessed panels and terminated in 6"x6"x4" junction boxes. Where ceiling is exposed mount junction boxes on wall at 24" above panel top.

.10 Conduit Identification - Color code coverplates of junction boxes in conduit systems as per the color code listed below. Color code by spray painting the coverplate on each junction box in conduit run. In addition to color coding coverplates on junction boxes with power wiring, the circuits being run in the box shall be identified on the inside of the coverplate with permanent felt marker.

a) 120/208V Normal Power: yellow
b) 120/208V Emergency Power: fluorescent red
c) 347/600V Normal Power: orange
d) 347/600V Emergency Power: fluorescent orange
e) Fire Alarm: red
f) Ground: green

.11 Conductors in conduit - type RW90, solid copper #10 AWG or smaller, stranded copper #8 AWG or larger, minimum #12 AWG, cross link polyethylene (XLPE) 90 deg C, 1000V.

.12 2 hour rated conductors in conduit - stranded copper Draka Lifeline RHW two hour rated conductors sized as indicated. Provide cable support every 50 feet of vertical run in conduit with Kellam grips in junction box. E.C shall verify with authority having jurisdication to confirm and verify type of feeders required prior to ordering and installation. Failure to do so does not constitute any extra costs to building owner/client.

.13 Armoured cable - type AC-90 (B/X) - solid copper #10 AWG or smaller, stranded copper #8 AWG or larger, minimum #14 in suites and #12 AWG in balance of facility, cross link polyethylene (XLPE), 90 deg C, 1000V, multi-conductor as required c/w bare CU ground wire, bare interlocked aluminum armour.

.14 Armoured Cable (Teck) - type Teck 90, solid copper #10 AWG or smaller, stranded copper #8 or larger, minimum #12 AWG, cross link polyethylene (XLPE) 90 seg C, 1000V, multi-conductor as required c/w bare CU ground wire, inner jacket black PVC, armour interlocked aluminum, outer jacket black PVC with FT-4 flame spread rating. Wires to be color coded black, red, blue and white in 4/C cable and numbered in cables of more than 4/C. Aluminum ACWU or aluminum Teck may be permitted for feeders larger than 150A.

.15 Wiring Methods -

a) Service entrance feeders - parallel or single runs of ACWU c/w ground wire.
b) Branch wiring home runs - RW90 wire in EMT conduit.
c) Branch circuit wiring concealed - AC90.
d) Branch circuit wiring surface - RW90 wire in EMT conduit.
e) Motor wiring - RW90 wiring in Liquid tight flex conduit or Teck 90.
f) Fire Alarm wiring - Multi-conductor Securex in EMT conduit or Multi-conductor armoured Securex where permitted.

2.2 FASTENINGS AND SUPPORTS

.1 U-shape, galvanized steel uni-strut, sized 1.6" x 1.6" x 0.1" thick, surface mounted, suspended or set in poured concrete walls and ceiling as required. Acceptable manufacturers: Burndy, Electrovert, Unistrut, Pilgrim or Pursley.

.2 Secure surface mounted equipment, conduit or cables on uni-strut channels using clips, spring bolts and nuts and cable clamps designed as accessories to basic channel members.

.3 Support suspended uni-strut channels with minimum 3/8" threaded rod hangers directly to building structure where possible.

.4 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors or nylon shields.

.5 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.6 Fasten exposed conduit or cables to building construction or support system using straps:

a) Two hole steel straps to secure surface conduits.
b) Beam clamps to secure conduit exposed steel work.

.7 Support conduit and cables at spacing of no more than 48" except for surface conduit rooms and corridors.

.8 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.9 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.10 Do not use wire lashings, perforated pipe straps or tye-wraps to support or secure raceways or cables.

.11 Do not use supports or equipment installed for other trades for conduit or cable support.

.12 Run conduit and cable support systems path perpendicular and parallel to building lines.

2.3 CUTTING AND PATCHING

.1 Pay the costs of all cutting and patching required for the installation of electrical work.

.2 Obtain the approval of the Consultant and/or Owner before arranging for any cutting. Patching shall restore the affected area to the original condition.

2.4 EXCAVATION AND BACKFILLING

.1 Excavate and backfill as required (and if applicable) for underground electrical services as indicated. Provide protective materials around and over services and be present at all times during the excavation and backfilling to supervise work. Backfilling shall restore the excavated area to the original condition and shall include sodding, compacting, paving and asphalt finish where required. As underground services shall be dimensioned on electrical "Record Drawings" and shall be referenced to established survey bench marks.

.2 Work shall be in accordance with the current CSA bulletin.

.3 Include all costs for excavation, backfilling and surface restoration, for any secondary underground electrical installation.

.4 Obtain all clearances for Hydro, water, sewer, MTS, cable prior to digging.

.5 Electrical contractor shall conduct a private utilities line locate for existing utilities prior to any excavation work commencing.

2.5 ACCESS DOORS

.1 Access doors shall be minimum #12 gauge prime coat painted bonderized steel. Each shall be complete with a heavy flush frame and anchor, concealed hinges, positive locking screwdriver lock, and mounting and finishing provisions to suit the finish material for which they are supplied. Access doors in fire rated ceilings, walls, partitions, structures, etc. shall be ULC listed and labelled and of a rating to maintain the integrity of the fire separation.

2.6 JUNCTION AND PULL BOXES

.1 Sheet steel construction with screw-on flat covers for surface or recessed mounting. Covers with 1" minimum extension all around, for flush-mounted pull and junction boxes.

.2 Cast-type with gasketed covers where exposed to weather.

.3 Install pull boxes in inconspicious but accessible locations.

.4 Provide pullboxes in conduit runs at maximum 100' spacing.

.5 Boxes shall be installed plumb and square to building lines.

.6 Install junction and pullboxes clear of all mechanical duct work and piping.

.7 Junction and pullboxes to be sized as per C.E.C.

.8 Identify junction and pullboxes as per voltage, system and circuit.

2.7 OUTLET BOXES AND FITTINGS

.1 4" square outlet boxes with extension and plaster rings, flush mounting devices in finished plaster and tile walls.

.2 Cast FS or FD feraloy boxes with factory threaded hubs and mounting feet for surface wiring of outlets where exposed to moisture.

.3 Bushings and connectors with nylon insulated throats. Double locknuts and insulated bushings on sheet metal boxes.

.4 Sectional boxes will be accepted.

.5 Support boxes independently of connecting conduits

.6 For flush installations, mount outlets flush with finished wall using plaster rings to permit wall finish to come within 1/4" of opening.

.7 Provide correct size of openings in boxes for conduit and cable connections. Use of reducing washers will not be allowed.

.8 Boxes shall be mounted plumb and square to building lines.

2.8 WIRING DEVICES

.1 Duplex receptacles - premium specification grade NEMA 5-15R, 125VAC, 15A U-ground, nylon face white, suitable for #10 AWG back and side wiring, break off links for split wiring, double wipe contacts and rivetted grounding contacts. Acceptable Manufacturers shall be Hubbell, Bryant, Leviton, Pass & Seymour, Arrow Hart and Woodhead. Duplex receptacles of one manufacturer throughout project. Mount receptacles vertically at 16" AFF unless otherwise noted. Provide premium specification Hospital grade receptacles in

all basic care areas or as indicated on drawings. Provide separate insulated ground wire for all circuits to Hospital grade receptacles.

.2 Corridor receptacles - premium specification grade NEMA 5-15RA, 125VAC, 20A U-ground T-slot nylon face white. Acceptable Manufacturers as per duplex receptacles.

2.9 PANELBOARDS

.1 Submit shop drawings in accordance with section 1.08. Drawings shall include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension. Factory install circuit breakers in panelboards before shipment. In addition to CSA requirements, manufacturer's nameplate shall show fault current that panel, including breakers, has been built to withstand.

.2 Panelboards built to CSA C22.2 No. 29-M1989 and shall be of one manufacturer throughout project.. Minimum 42 circuit, 200A unless otherwise noted.

.3 CDP panels built to CSA C22.2 No. 29-M1989 and shall be manufactured to allow installation of two 200A frame breakers adjacent to each other - horizontally. CDP panels to be of one manufacturer throughout project.

.4 Panelboards and CDP panels bus and breakers to be rated for short circuit withstand ampacity as indicated on drawings but in no case shall be less than 10kA for 250V branch panelboards, 25kA for 250V CDP panels, 18kA for 600V panels and 22kA for 600V CDP panels.

.5 Panelboards and CDP panels shall have copper bus with full size neutral (where required), copper ground bus, keyed alike locks with two keys for each, flush or surface mounted tubs as shown, finish trim and door baked grey enamel. Provide fully hinged, lockable front panel covers for all Panelboards and CDP panels. Provide spare breakers and spaces as indicated on drawings

.6 Breakers to section 2.10.

.7 Main breaker: mounted on top or bottom of panel to suit cable entry. Reverse fed branch bus mounted main breakers will not be accepted.

.8 Provide lock-on devices for 5% of 15A branch breakers installed and for fire alarm, emergency, exit and night light circuits. Turn unused locks over to Owner.

.9 Provide equipment identification as per drawings. Provide typewritten panel legend showing location and load of each circuit. Provide lamicoids nameplate beside each breaker in CDP panels.

.10 Acceptable manufacturers: Cutler-Hammer, Square D, Siemens and GE.

.11 Load centres with feed through lugs shall be permitted for suite panels.

.12 Locate panelboards and CDP panels as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.13 Install surface mounted panelboards and CDP panels on uni-strut except for surface panels in corridors or finished areas which shall be mounted directly to wall.

.14 Connect loads to circuits as indicated and provide a separate neutral for each branch circuit.

.15 Mount panelboards at 78" AFF to top of panelboard.

2.10 CIRCUIT BREAKERS

.1 Submit shop drawings in accordance with section 1.08.

.2 Bolt-on moulded case breaker, quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40 deg C (140 deg F). Common-trip breakers with single handle for multi-poke applications Magnetic instantaneous trip elements in circuits, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable instantaneous trips to range from 3-10 times current rating. Provide LSI trip units for all breakers 300-amps and higher.

.3 Moulded case circuit breaker shall operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping under overload conditions and instantaneous magnetic tripping for short circuit protection.

.4 Acceptable manufacturers: Cutler-Hammer, Square D, Siemens and GE.

2.11 UTILITIES UNDERGROUND SERVICE

.1 Make all arrangements and co-ordinate with Hydro supply authority to ensure availability of service when required.

.2 Submit all required drawings to supply authority for their approval.

.3 Refer to Section 01001, 1.2 for cash allowance requirements associated with electrical service by the supply authority.

.4 Pad mounted transformers and primary underground cabling to CSTE shall be supplied and installed by supply authority, unless otherwise indicated.

.5 Provide secondary cables from CSTE to main distribution as indicated. Allow adequate conductor length for termination.

2.12 GROUNDING

.1 Grounding conductors system, circuit and equipment grounding to be bare stranded copper, sized in accordance with the Canadian Electrical Code.

.2 Non-corroding accessories necessary for grounding system, type, size, material as indicated including but not necessarily limited to: .1 grounding and bonding bushings, .2 protective type clamps, .3 bolted type conductor connectors, .4 compression type conductor connectors, .5 bonding conductors, straps, .6 pressure wire connectors.

.3 Install complete permanent, continuous, system and circuit, grounding systems including electrodes, conductors, connectors and accessories to conform to requirements of local authority having jurisdiction over installation.

.4 Install connectors to manufacturer's instructions.

.5 Protect exposed grounding conductors from mechanical injury.

.6 Make buried connections using Burndy "HYPRESS" connectors.

.7 Use mechanical connectors for grounding connections to equipment provided with lugs. Soldered joints not permitted.

.8 The main public metallic water service to the facility shall be utilized as the main ground electrode. Where such a service does not exist, an artificial grounding electrode shall be provided to suit the requirements of the local inspection authorities.

.9 Install bonding wire for flexible conduit, connected to both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.10 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.11 Provide separate ground conductors in PVC conduit, plastic or fibreglass raceways.

.12 Install system and circuit grounding connections to neutral points of 600V and 208V systems.

.13 Install grounding connections to typical equipment including, but not necessarily limited to: service equipment, transformers, frames of motors, building steel work.

.14 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of the local inspection authority. Perform tests before energizing electrical system. Disconnect ground fault indicator, if provided, during tests. A report shall be submitted to the Consultant from the testing agency.

2.13 LIGHTING

.1 Submit shop drawings in accordance with section 1.08.

.2 Provide luminaires as specified on drawings or equal c/w lamps. Provide two spare lamps and one spare ballast for each type of luminaire onsite. All ballasts shall be electronic premium gold label approved by Manitoba Hydro for Power Smart Rebate. Electrical contractor shall be responsible for providing complete ballast information and completion of application for Power Smart rebate on behalf of client.

.3 Suspend luminaires from building structure on and ensure that they are parallel and perpendicular to building lines.

.4 Replace all defective ballasts and lamps for a period of 12 months after substantial completion of project.

- END OF SECTION -