

CRESTWOOD SECONDARY SCHOOL MECHANICAL UPGRADES - 2021

1885 Sherbrooke Street West, Peterborough, Ontario K2K 0G2

Tender PUR21-067-ITT



KAWARTHA PINE RIDGE DISTRICT SCHOOL BOARD

ARCHITECTURAL SPECIFICATIONS PROJECT MANUAL VOLUME 1

MOFFET & DUNCAN ARCHITECTS INC.

Prime Consultant

RAVENS ENGINEERING INC.

Structural Engineer

DEI CONSULTING ENGINEERS

Mechanical & Electrical Engineers

VOLUME 1 ARCHITECTURAL SPECIFICATIONS

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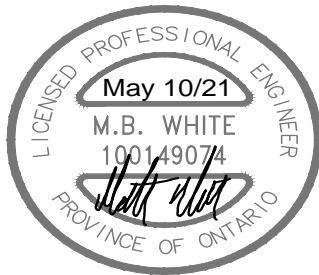
**CRESTWOOD SECONDARY SCHOOL
MECHANICAL UPGRADES - 2021
FOR
KAWARTHA PINE RIDGE DISTRICT SCHOOL BOARD**

PROFESSIONAL SEALS

Architectural
Moffet & Duncan Architects Inc.



MECHANICAL
DEI Consulting Engineers



ELECTRICAL
DEI Consulting Engineers



The seals above pertain to the specification sections bearing the name of the relevant consultant at the bottom of each page.

Moffet & Duncan Architects Inc.

1.1 **SUMMARY**

- .1 The purpose of this Contract is to perform mechanical upgrades at an existing school located at 1885 Sherbrooke Street West, Peterborough, Ontario K2K 0G2.
 - .1 The Contract will include, hazardous materials abatement, selective demolition and alterations, structural steel, ceilings, roofing, painting, mechanical and electrical work, and other related work for the renovation of existing school.
- .2 The Contract shall be subject to the requirements of the General Conditions of Stipulated Price Contract CCDC 2 - 2008 and the Supplementary General Conditions herein.

1.2 **COMPLETION DATES**

- .1 Tenders must confirm that contractor will meet critical completion dates listed in the Request for Tender documents.
- .2 Shop drawing process shall start upon receipt of "Award Letter" issued by the Owner to the Contractor. Work must continue as necessary to ensure completion by dates given in tender.
- .3 Materials and equipment with long delivery times must be ordered as soon as possible on award of Contract.
- .4 Classes commence on **Tuesday, September 7, 2021**. Any work within the school, and outside of hoarded areas on site, must be undertaken outside of regular school hours after that date.
- .5 It is understood that mechanical equipment will not be delivered on time for September and that School Board will arrange for Contractor to have access to work areas and allow for the installation of one mechanical unit at a time before allowing access to next work area.
- .6 Refer to Phasing Drawing for detailing schedule.

1.3 **SCOPE OF WORK**

- .1 Each proposal shall include the complete work, as called for by drawings and the Specifications issued for the project. The Contractor must include for connection of the Owners equipment. Where furniture, fitments, or manufactured items, such as dishwashers, are noted "N.I.C." they are not included in tender but they must be set in place and connected to services after being supplied to site by the Owner's forces.

1.4 **TAXES AND DUTIES**

- .1 The successful bidder must provide their H.S.T. registration number and this number must be indicated on each application for payment along with the amount of H.S.T. payable for the billing period.

1.5 MANDATORY PRE-BID MEETING

- .1 Before tendering, the tenderer shall examine the Drawings and Project Manuals and the supplementary information provided in the Tender Documents and shall ascertain the extent and nature of the work.
- .2 Proposals shall include the cost imposed by existing conditions and limitations of site and the accepted proposal shall be held to have included such costs.
- .3 The information shown on the drawings is furnished in good faith for the guidance of the Contractor.
- .4 The Contractor shall not be entitled to extra payment and/or performance time for work which is required and which is reasonably inferable from the drawings as being necessary.

1.6 BUILDING PERMIT

- .1 Building Permit has been applied for by the Consultant and will be paid for by the Owner. The Contractor shall expedite and pick up Building Permit at the Municipal Offices. Refer to the General Conditions of CCDC2-2008, and the Supplementary General Conditions in Section 00 73 00 of these Specifications.
- .2 The Contractor must pay all other necessary fees and charges related to Municipal, Provincial and Federal requirements including plumbing, heating, elevator permit and occupancy permit.

1.7 CONTRACT DOCUMENTS

- .1 The Contract shall be subject to the requirements of the General Conditions of Standard Construction Document CCDC 2 - 2008 and the Supplementary Conditions herein. Successful bidder must sign Stipulated Price Contract using this document, the Project Manuals and the accompanying drawings, including any addenda issued prior to close of tender period, promptly upon notification of award.
- .2 All Contractors will be held to have examined and made themselves familiar with the various articles of these Standard Forms and the amendments contained in the Supplementary Conditions, and the same shall be as binding for all branches of the following specifications as though written in full therein.

1.8 SUBCONTRACTORS

- .1 The selection of Subcontractors shall be acceptable to the Owner and to the Consultant. If the required substitution of a Subcontractor affects the sub-tender price, an adjustment will be made to the Contract Price by the amount only of the difference in sub-tenders, without additional overhead or profit to the Contractor. THERE SHALL BE NO CHANGE IN ANY SUB-TRADES LISTED IN THE TENDER AND SUPPLEMENTARY TENDER FORMS WITHOUT THE WRITTEN CONSENT OF THE OWNER.
- .2 If the Tenderer proposes to do the Work with persons directly employed by him and not subcontract them he shall insert the words "By Own Forces" provided he can submit proof that his forces have had previous experience in this field.

- .3 Subcontractors shall be actually engaged as their own recognized business, in the line of the Work required by the specifications and shall carry out themselves the work for which they may be awarded by subcontract. They shall not be permitted to re-subcontract their work or portions thereof to other contractors. This includes shop drawings.

1.9 FAIR WAGE AND LABOUR

- .1 Rate of wages, hours and conditions of the Work shall be in accordance with Provincial codes and as generally recognized and accepted in the locality.
- .2 Labour forces employed on the site shall have compatible affiliation with any labour organization. Union contract itself is not a prerequisite.

1.10 PAINTING

- .1 The Owner has awarded the painting subcontract to Tradeworks Interiors Canada Corp. (Mr. Nick Soldatos 416-292-7100).
- .2 Bidders shall include the specified painting allowance amount in their bids.

END OF SECTION

PART 1 - GENERAL

1.1 SITE SUPERVISOR

- .1 The Contractor shall be fully responsible for co-ordinating and expediting the work of all Subcontractors and shall employ a qualified Site Supervisor who shall be in full time attendance on this project.
- .2 Prior to the Preconstruction Meeting, the Contractor shall inform the Consultant of their choice for Site Supervisors and shall provide resumes outlining qualifications and related work experiences.
- .3 Site Supervisor shall have as a minimum:
 - .1 Recent, previous experience with renovation projects involving occupied buildings including (but not limited to) school construction, sites with students, pedestrian and vehicular traffic.
 - .2 Successful completion of a multi-session Supervisor's training course conducted by a recognised Construction Association in Ontario.
- .4 The Supervisors must be assigned to projects for the duration of the construction period, until the buildings are fully occupied by the Owner.
- .5 The Owner and the Consultant reserve the right to reject the proposed Supervisors should they feel that they are not fully qualified to assume the responsibilities of the positions.
- .6 There shall be a minimum of one full time Site Supervisor dedicated to the site.
- .7 Site Supervisor must carry a cell phone at all times during construction with the ability to be reached directly during all work hours and the ability to have voicemail recorded during all non-work hours including weekends and holidays.
- .8 Once the Supervisors are confirmed, there will be no change permitted without the written consent of the Consultant.

1.2 CONSULTANT/CONTRACTOR MEETING

- .1 Prior to the commencement of the Work, the Contractor together with the Consultant shall mutually agree to a sequence for holding regular "site meetings" on same day (to be determined) of every second week.

1.3 PRE-CONSTRUCTION MEETING

- .1 Immediately prior to construction, upon notification, attend at location of Owner's choice, pre-construction meeting, along with authoritative representatives of certain key Subcontractors as specifically requested by the Consultant.
- .2 Purpose of meeting is as follows:
 - .1 Review project communications procedures.

01 31 00 - PROJECT MANAGEMENT AND COORDINATION

- .2 Review contract administration requirements including submittals, payment and change order procedures.
- .3 Identify all critical points on Construction Schedule for positive action.
- .4 Identify any product availability problems and substitution requests.
- .5 Establish site arrangements and temporary facilities.
- .6 Review any items which, in the Board's, Consultant's and Contractor's opinion, require clarification.
- .7 Exchange names & addresses of all key personnel representing Owner, Consultant, Contractor and Subcontractors.
- .8 Identify Consultant's inspection requirements.

1.4 PROJECT MEETINGS

- .1 Consultant shall Chair project meetings on Site, on a regular basis and will issue minutes to Owner's Representative, Consultants, and Contractor.
- .2 Consultant shall take minutes of meeting showing:
 - .1 List of persons attending.
 - .2 Decisions taken.
 - .3 Instructions required or issued - Allocating responsibilities to action items.
 - .4 All matters discussed.
 - .5 Schedule Update - Progress, Delays.
- .3 Contractor shall provide suitable on site accommodation for meeting, attend all meetings, arrange for attendance of all necessary Subcontractors, and distribute minutes of previous meeting to Subcontractors and Suppliers as appropriate.
- .4 The Contractor's representatives at site meetings must include the project co-ordinator as well as site Supervisor.
- .5 Contractor shall hold regular co-ordination meeting with Subcontractors and shall chair and minute each meeting. Copies of minutes shall be distributed to relevant Trades and Consultants and Owner.
- .6 In addition to jobsite meetings, Contractor shall arrange for, chair, and record safety meetings and regular meetings with his Subcontractors and suppliers. He shall distribute copies of the minutes of these meetings to all Subcontractors, Owner and Consultant.

1.5 ON SITE DOCUMENTS

- .1 The Contractor shall maintain the following documents, up to date, in the site office:
 - .1 Contract Documents
 - .2 Reviewed Shop Drawings - Printed in full colour or redline
 - .3 All instructions and changes, i.e. Work Authorization, Jobsite Instructions, Notices of Contemplated Change, Change Orders, etc.
 - .4 All inspection and test reports
 - .5 Permit drawings and specifications
 - .6 Authorizations, approval documents, permits, special rulings, etc., issued for the project by Authorities Having Jurisdiction.

01 31 00 - PROJECT MANAGEMENT AND COORDINATION

- .7 Details of tested assemblies being used on the project; ULC, cUL, etc.
- .8 As-Built drawings.

- .2 Confirm with building inspector, at the commencement of construction, what documents are required for submission both during construction and for occupancy. Keep copies of such documents on site. Refer also to Section 01 41 00, Regulatory Requirements.
- .3 Documents listed above shall be printed, full size documents, not only digit format.
- .4 Maintain copies of Regulating Documents referred to in the specifications, up to date, in the site office.
- .5 Maintain a file of Material Safety Data Sheets (MSDS) for all materials being used on site and make available to all concerned, in the site office.
- .6 Maintain a hard copy of available existing construction documents in the site office.

END OF SECTION

PART 1 - GENERAL

1.1 SCHEDULE

- .1 Within fifteen (15) days of contract award, submit a detailed construction schedule. Base the submission on the commencement of completion dates of the Contract and indicate specified restraints and milestones, activities and durations for shop drawing submission and approval, testing, fabrication and delivery, construction sequence and timing, interdependencies and constraints. Include the procurement activities for major structural elements, cladding, windows, and mechanical and electrical equipment. Ensure the participation of all major Subcontractors and Suppliers. Schedule must include reasonably detailed breakdown of mechanical, and electrical work.
- .2 Schedule shall show:
 - .1 Commencement and completion dates of Contract.
 - .2 Commencement and completion dates of stipulated stages.
 - .3 Commencement and completion dates of Trades.
 - .4 Order and delivery times for materials and equipment, where possible.
 - .5 Dates for submission of Shop Drawings, material lists and samples.
 - .6 Any other information relating to the orderly progress of Contract, considered by Contractor to be pertinent.
- .3 The schedule shall be reviewed and updated at every Site meeting.
- .4 Include with each update a written report of activity progress reflected in the revised Schedule, and the corrective actions which have been made or are to be taken to maintain progress on the schedule in the future, anticipated delays, resources availability, schedule changes, and work to be completed in the next 2 month period.

1.2 UPDATING AND MONITORING

- .1 Set up format of Construction Schedule to allow plotting of actual progress against scheduled progress.
 - .1 Allow sufficient space for modifications and revisions to the Schedule as Work progresses.
 - .2 Format shall be approved by the Consultant.
- .2 Display copy of Schedule in Site office during complete construction period and plot actual progress weekly.

01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

.3 Updating:

- .1 Arrange participation, on Site and off Site, with Subcontractors and Suppliers, as and when necessary for the purpose of updating schedule and monitoring progress.
- .2 Conduct reviews of progress and update schedule, distributing copies to Consultant, Owner and Sub-Trades at least once a month or as directed by Consultant.

1.3 PROGRESS REPORTS

- .1 Keep a permanent written report on the Site of progress of the Work. This record to be open to review by the Consultant. A copy to be furnished to the Consultant upon request.
- .2 Indicate daily the number of persons engaged on the work (including subtrades) and the division and section of the work upon which each group of workers is engaged, in sufficient detail to record dates of construction of each particular section of work.
- .3 Record to show dates of commencement and completion of trades and parts of the work coming under the Contract, including reports on daily weather conditions, excavation work, erection and removal of forms, and other similar pertinent information.
- .4 Report delays (and potential delays) giving reason for delay and action being taken to resolve the problem.

1.4 PROGRESS PHOTOGRAPHS

- .1 Concurrently with monthly application for payment, submit electronic format colour images clearly showing overall progress of Work. Include, in particular, any work completed since the most recent site meeting and Consultant field review.

1.5 QUALITY OF WORK / STATUS REPORTS

- .1 The Contractor shall take full responsibility for the quality of work on site. The Contractor shall furthermore notify workers of deficient work immediately upon receipt of notification of deficiencies by the Consultant, Subconsultants and/or Owner.
- .2 The Contractor shall provide a monthly status report on the status of deficiencies identified by the Consultant and Subconsultants. The report shall include a description of each deficiency, status of the deficiency, description of corrective action taken, value (cost) to the correct deficiency and trade (person) responsible for deficiency. The report shall be typewritten on the Contractors letterhead. A copy of the report format shall be submitted at least 2 weeks prior to the first progress draw, for review. Submit monthly status reports with each progress draw.
- .3 After Substantial Performance, the Contractor shall continue provide the deficiency status reports on a monthly basis, including updated lists of deficiencies identified by the Owner and consultants.

END OF SECTION

PART 1 - GENERAL

1.1 BEFORE COMMENCEMENT OF WORK

- .1 Obtain the documents listed under this heading and supply to Consultant within the time stipulated in the Specification, or if not so stipulated, before issue of the first Certificate.
 - .1 Performance Bond/Labour and Material Bond.
 - .2 Insurance Policies required under General Conditions of Contract - Insurance.
 - .3 Certificates of good standing from the Workplace Safety & Insurance Board for the Contractor and all Subcontractors.
 - .4 Shop Drawing Schedule.
 - .5 Permits required for work of Mechanical Trades (Divisions 21, 22 23, and 25) and Electrical Trades (Divisions 26, 27 and 28).
 - .6 Permits for temporary structures, hoists, etc.
 - .7 Schedule of Values: Refer to General Conditions of Contract.
 - .8 Estimate of monthly progress claims (cash flow schedule).
 - .9 Construction Schedule.
 - .10 Equipment Delivery Schedule.
- .2 Concurrently, with schedule of values, submit cash flow schedule broken down on a monthly basis, indicating anticipated monthly progress billings for duration of the Contract.
- .3 Submit schedule in a format acceptable to the Consultant. Indicate anticipated submission dates and review periods. Highlight critical items.
- .4 Submit, in a format acceptable to the Consultant, a list of manufactured equipment complete with order dates, anticipated delivery dates, and dates required on site to meet progress schedule. Update schedule at least once a month or more often if directed by the Consultant. Clearly indicate late deliveries and anticipated impact on construction schedule. Include in schedule required delivery dates for products supplied by Owner.
- .5 Schedule of Values:
 - .1 Before submitting first request for payment, submit a detailed breakdown of the Contract price, as directed by the Consultant and as per the Owner's format. Breakdown must equal Contract price. After approval by Consultant, cost breakdown will be used as basis for progress payments.

01 33 00 - SUBMITTAL PROCEDURES

1.2 DOCUMENTS AND ACTION REQUIRED DURING PROGRESS OF CONTRACT

- .1 Perform the action and/or obtain the documents listed under this heading and supply to the Consultant, within the time stipulated in the Specification or, if not so stipulated, as soon as possible following Consultant's request.
- .2 Adjust Cash Allowances by award of separate Contracts, where appropriate.
- .3 Documents specified under Section 01 10 00, General Instructions and Section 01 33 23, Shop Drawings, Product Data and Samples.
- .4 Progress photographs, submitted concurrently with monthly application for payment. Refer to Section 01 32 00.
- .5 Any permits required from Authorities Having Jurisdiction enabling Owner to occupy the work (or part thereof) prior to Substantial Performance of the Contract.
- .6 As-Built Documents:
 - .1 The Owner requires as-built documents for all architectural, structural, mechanical and electrical changes on completion of the construction.
 - .2 The Contractor, and mechanical and electrical Subcontractors shall obtain, from the Consultant, a complete and separate set of white prints of Contract Drawings and Project Manual to keep on the site at all times.
 - .3 The drawing prints shall be marked up by responsible personnel of the Contractor and Subcontractors to record clearly, neatly, accurately and promptly showing all locations of buried structural, mechanical and electrical work and deviations from the contract documents.
 - .4 The Project Manual shall be similarly marked up to reflect deviations from the Contract Documents, as well as indicate materials used, colours selected, etc.
 - .5 The accurate location, depth, size and type of each underground utility and service line shall be recorded before concealment to ensure accurately directed future access to these buried lines.
 - .6 The as-built documents will be reviewed at regular intervals by the Consultant and the quality of performance by the Contractor and Subcontractors in developing these records will be taken into consideration when reviewing the monthly applications for payment submitted by the Contractor.
 - .7 Prior to the date of Substantial Performance, request from the Consultant updated drawings incorporating all changes made to the building through Change Orders and Jobsite Instructions. Transfer all recordings from the white prints to these updated drawings and return them to the Consultant, as specified in Section 01 78 00, Close-out Submittals.
 - .8 Mark "as-built" changes in red coloured ink.

- .9 Record following information:
 - .1 Depth of various elements of foundation in relation to first floor level if different from contract documents.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by Change Order or Supplementary Instructions.
- .10 Clearly mark each of the drawings, "Project As-Built Record Copy".
- .11 Final completion of these Drawings shall be a condition precedent to the issuance of Consultant's final payment certificate.
- .12 Refer to Mechanical and Electrical Specification Divisions for more specific requirements regarding preparation and submission of final Record Drawings.

END OF SECTION

PART 1 - GENERAL

1.1 SCHEDULE

- .1 Within 5 working days after award of Contract, prepare and submit to Consultant for comment, a schedule fixing the dates for the submission of all Shop Drawings, product data and samples.
- .2 Allow reasonable promptness for Consultant to review submissions, exclusive of time required for inter-office transmissions.
- .3 All shop drawings must be reviewed and stamped by the Contractor prior to submission to the Consultant.

1.2 GENERAL

- .1 Submit to Consultant, for review, Shop Drawings, Product Data, Samples, and other required submittals specified.
- .2 All shop drawings and related submittals must be reviewed and stamped by the Contractor prior to submission to the Consultant.
- .3 Until submittal is reviewed, Work involving relevant product may not proceed.
- .4 Do not use for construction, Shop or setting Drawings or diagrams which do not bear Consultant's stamp and name of reviewer.
- .5 Shop drawing reviews do not authorize changes in cost or time, which may only be accomplished by an appropriate Change Order issued through the Consultant.
- .6 Shop drawings shall be for products as specified or otherwise approved by the Consultant. The shop drawing process is not a means of requesting substitutions. Refer to Section 01 10 00, for the process for requesting approval of substitutions.
- .7 Submission and subsequent review of Shop Drawings constitute a service and does not entitle the Supplier or Subcontractor to the right to remuneration until the materials are supplied and installed on the Site in accordance with the Contract.
- .8 The Contractor must include for delivery and pick up of shop drawings to/from the Consultant by hand or courier.
- .9 The Contractor must include for reproduction of shop drawings after review by the consultants.

1.3 SHOP DRAWINGS

- .1 Drawings shall be copies of original drawings prepared by Contractor, subcontractor, supplier or distributor, for the work of the Contract which illustrate appropriate portions of the Work. Shop drawing submissions shall show pertinent information for incorporation of the products and equipment, including the following, as applicable:
 - .1 fabrication details

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- .2 dimensioned layout drawings, including clearances, with site dimensions
 - .3 relationship to adjacent work
 - .4 setting or erection details
 - .5 performance requirements
 - .6 operating weights of equipment
 - .7 installation instructions
 - .8 service connection requirements, including wiring diagrams
 - .9 single line and schematic diagrams
 - .10 additional information as may be specified in applicable Specification Sections.
- .2 Note that some shop drawings are required to be approved by a Professional Structural Engineer in the Contractor's employ. These include:
- .1 structural steel
 - .2 reinforcing steel
 - .3 mechanical and electrical equipment - structural supports
 - .4 and other items as required in the specifications.
- .3 Submit Shop Drawings with transmittal forms listing:
- .1 the project name and number
 - .2 the names of the manufacturer, supplier, subcontractor
 - .3 the applicable Drawing numbers
 - .4 the number of copies
 - .5 the names of the items included the submittals
 - .6 number of Specification section to which the Shop Drawings refer
 - .7 dates and revision numbers, and submission numbers
- .4 All dimensions on shop drawings must be in metric.
- .5 Where approvals are required by Authorities having jurisdiction, submit Shop Drawings to those authorities and obtain the approvals required.
- .6 On Shop Drawings for fire rated assemblies show required fire rating and ULC design numbers.
- .7 Submit two (2) to five (5) copies of printed shop drawings as follows:
- .1 Submissions shall be in sufficient quantities for distribution to all reviewers, plus one copy to be returned to the Contractor for reproduction and distribution.
 - .2 The prime Consultant requires one copy of every submission, of all disciplines.
 - .3 Each sub-consultant, of each discipline, will retain one copy of the shop drawings. Where one sub-consultant is responsible for the review of more than one discipline, they will require multiple copies, as applicable.
 - .4 For architectural submissions which do not need to be reviewed by sub-consultants, only two copies are required.
 - .5 Refer to sections prepared by the sub-consultants for possible variations on these requirements.

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- .8 Email Submission:
- .1 Submittals that are formatted for 11" x 17" (279 x 432mm) sheets or smaller may be submitted by email, provided the total number of pages, for the entire submission, does not exceed 15.
 - .2 Submittals must be submitted in the same size and scale as they were originally prepared. Drawings may not be reduced in size for email transmission.
 - .3 If acceptable to the individual reviewers, larger format submittals and larger volume submittals may be reviewed by email submission. The Contractor must subsequently print and submit full sized, red line copies of such reviewed documents to the Consultant.
 - .4 Email submissions must be in pdf format and must be high quality documents, preferably generated by computer from the original documents (rather than scans of printed documents). If digital submissions are of insufficient quality, hard copies will be required.
 - .5 Emailed documents shall be reviewed and stamped digitally by the Contractor, or accompanied by a separate sheet from the Contractor listing the documents reviewed and bearing the Contractor's review stamp, along with copies of any revisions made.
 - .6 Email submission is only used as a convenient means of distributing drawings, in lieu of sending hard copies by courier. Reviewed drawings must still be printed for job site files, record copies, etc. All site copies shall be red line prints or colour prints.
- .9 Drawings shall be of a size and quality which will be readily reproduced. Shop drawings must be certified to have been reviewed and corrected by Contractor and sub-contractor responsible for forwarding to the Consultant.
- .10 Shop drawings are to be to scale. Scale shall be large enough to adequately review details included. Provide site measured dimensions on drawings wherever possible.
- .11 All requirements for shop drawings apply also to resubmissions of shop drawings, as may be required by the Consultant.
- .12 Revise all reviewed shop drawings to incorporate Consultant's comments. One complete set of final, revised Shop Drawings, used for construction, shall be submitted to the Consultant.
- .13 Shop Drawings are required for the following items:
- Structural Steel
 - Architectural Metals
 - Roof Accessories
 - Hollow Metal
 - Hardware Schedule and Data
 - Roofing
 - Mechanical and Electrical Equipment as listed in those specification sections
 - Other items as may be requested within the specifications
- .14 Refer also to the General Conditions of the Contract and Section 00 73 00, Supplementary Conditions.

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

1.4 PRODUCT DATA

- .1 Certain Specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of Shop Drawings.
- .2 The above will be accepted if they conform to the following:
 - .1 Delete information which is not applicable to project.
 - .2 Supplement standard information to provide additional information applicable to project.
 - .3 Show dimensions and clearances required.
 - .4 Show performance characteristics and capacities.
 - .5 Indicate operating weight of equipment.
 - .6 Show wiring diagrams and controls.
 - .7 Add to standard sheet the Project identification data.

1.5 SAMPLES AND MOCK-UPS

- .1 Where specified, shown or considered necessary, submit duplicate samples for Consultant's approval.
- .2 Where colour, pattern or texture is to be selected, submit full range of physical samples.
- .3 Samples must correspond in every respect to materials supplied for project.
- .4 Construct field samples and mock-ups at locations acceptable to Consultant.
- .5 Construct each sample or mock-up complete, including work of all trades required to finish work.
- .6 Do not proceed with fabrication or delivery of materials until samples are approved.
- .7 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on project.
- .8 Approval of samples does not imply acceptance of finished work.

1.6 CONTRACTOR'S RESPONSIBILITY

- .1 Prior to submission to the Consultant, review all shop drawings, samples, product data, and other required submittals as follows:
 - .1 Verify that the submission is for products as specified, or otherwise approved by the Consultant.
 - .2 Ensure that the submission is complete.
 - .3 Note any potential interference issues and co-ordinate with the trades to avoid these conflicts.
 - .4 Verify:
 - .1 Field measurements.
 - .2 Field construction criteria.
 - .3 Catalogue numbers and similar data.

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

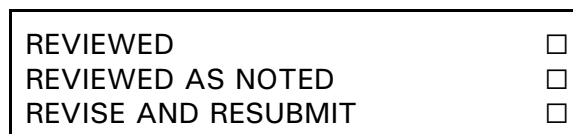
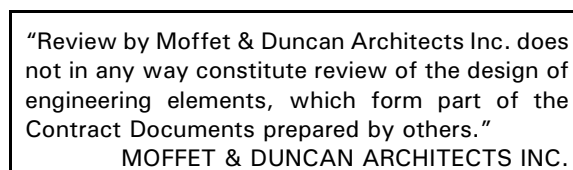
- .2 Coordinate each submittal with requirements of Work and Contract Documents. Refer to Section 01 10 00, General Instructions, and the subsection on Coordination.
- .3 Notify Consultant, in writing at time of submission of any deviations in submittal from requirements of Contract Documents.
- .4 Stamp, initial or sign each Drawing, certifying approval of submission, verification of field dimensions and measurements and compliance with Contract Documents, prior to submission to the Consultant(s).
- .5 The Contractor shall be responsible for reproducing and distributing reviewed shop drawings, except for those copies required by the Architect and Consultants.
- .6 After Consultant's review, distribute copies as follows:
 - .1 Job Site file (2 copies) - colour or redline copies
 - .2 As-built documents file.
 - .3 Other prime contractors.
 - .4 Subcontractors.
 - .5 Supplier.
 - .6 Fabricator.
 - .7 Authorities having jurisdiction, where required by Codes and/or By-Laws, i.e. structural steel and sprinklers.
 - .8 Owner's Maintenance Manual (revised, as-built copies).
- .7 Distribute samples as directed by the Consultant.
- .8 Ensure that all samples are approved by authorities having jurisdiction, supplier for correct application in Project, and other parties such as Owner in time to permit approval prior to ordering of quantity delivery to Site.
- .9 The Contractor shall advise all Trades, Subcontractors and suppliers of the limits of the Consultant's responsibility with respect to Shop Drawings and other submittals, as detailed below.

1.7 CONSULTANT'S RESPONSIBILITY

- .1 With reasonable promptness from the receipt of samples and Architectural shop drawings, the Consultant shall review them and return them to the Contractor. Allow 15 working days for review of shop drawings.
- .2 Review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the processes or techniques of construction and installation and for co-ordination of the work of all subtrades.

01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- .3 Shop drawing markings shall be interpreted as follows:
- .1 Shop drawings marked "REVIEWED" by Consultant and/or Subconsultants are released for construction.
 - .2 Shop drawings marked "REVIEWED AS NOTED" by the Consultant or his Subconsultants are also released for construction, after revisions noted are made; with final copies sent to the Consultant.
 - .3 Shop drawings marked "REVISE AND RESUBMIT" by the Consultant or his Subconsultants are NOT released for construction and must be resubmitted after being revised in accordance with the consultants' comments.
 - .4 Shop Drawings marked with the Consultant's "RECEIVED" stamp only have not been reviewed by the Consultant.
- .4 Review by the Architect does not in any way constitute review of the design of engineering elements, which form part of the Contract Document's prepared by others.
- .5 Shop drawings for products that are not a specified item, or an approved substitution, will be rejected without being reviewed.
- .6 Shop drawings which have not been requested will be returned to the Contractor with no action taken by the Consultant.
- .7 The Architect will use the following stamps in reviewing Shop Drawings:



01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

"This review by Moffet & Duncan Architects is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Moffet & Duncan Architects Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or his responsibility for meeting all requirements of the Construction and Contract Documents. 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 co-ordination of the work of all sub-trades."

MOFFET & DUNCAN ARCHITECTS INC.

REVIEWED BY	
DATE	
PROJECT No.	

END OF SECTION

PART 1 - GENERAL

1.1 CONSTRUCTION SAFETY

- .1 Observe and enforce construction safety measures required by the National Building Code of Canada, Canadian Construction Safety Code, Ontario Occupational Health and Safety Act, Workplace Safety & Insurance board (WSIB) and Municipal Statutes and Authorities.
 - .1 The Contractor is again reminded that the Contractor is responsible for Occupational Health and Safety on this project. The items listed below are only guidelines of the Owner's expectations in this regard and not to be construed to be comprehensive or total in nature.
- .2 In particular, the Ontario Construction Safety Act, the regulations of the Ontario Department of Labour and Ontario Hydro Safety Requirements shall be strictly enforced.
- .3 In event of conflict between any provisions of above authorities the most stringent provisions will apply.
- .4 The Owner will take every reasonable precaution to prevent injury or illness to students, employees and the public, participating in Owner activities, or performing their duties. This shall be accomplished by providing and maintaining a safe, healthy working environment and by providing the education necessary to perform these activities or duties safely.
- .5 The Owner is also vitally interested in the health and safety of Contractors and their workers performing work for the Owner. Cooperation and support of the Contractor in the protection of the workers from injury or occupational disease is a major, continuing objective of the Owner. To achieve these goals, the Owner, in concert with the Contractors, will endeavour to make every effort to ensure that the Contractors provide a work site which is a safe and healthy work environment. The Owner insists that all Contractors and their workers are dedicated to the continuing objective of reducing risk and injury.
- .6 The Contractor covenants and agrees to comply with all statutory and other obligations, including without limitation, the provisions of the Occupational Health and Safety Act (Ontario) and all Regulations thereto, and all amending and successor legislation, in connection with all work performed by either the Contractor, Sub-contractors, or any Other Contractor on, or in connection with, the Project.
- .7 Without limiting the foregoing, for the purposes of this Contract, the Contractor agrees that it shall be the "constructor" of the Project within the meaning of the Act, and as such, shall assume all the obligations and responsibilities, and observe all construction safety requirements and procedures, and duties of inspection imposed by the Act on the "constructor", as therein defined, for all work and services performed by the Contractor, Subcontractors and Other Contractors on or in connection with the Project. The Contractor further covenants and agrees that the Owner and its existing and former officers, trustees, employees and agents, and their respective heirs, executors, administrators, successors and assigns shall be released from any obligations or liabilities otherwise imposed on the Owner, or on any of them, pursuant to the Act in connection with the Project, and that the Contractor shall assume all liability and responsibility in connection with same. The Contractor agrees to save harmless and indemnify the Owner from any losses, damages, costs and expenses of any kind, or nature whatsoever, including all

SECTION 01 35 20 - SAFETY REQUIREMENTS

legal expenses, and all defence costs and related expert or consulting fees, incurred by the Owner, or any of them, arising in connection with the failure, default, or inability of the Contractor of the Owner, or any of them, to comply with any of the aforementioned statutory, or other legal requirements, or arising in connection with any breach by the Contractor of any of its covenants, agreements and obligations under this Contract.

- .8 The Contractor shall inform and instruct Other Contractors that they, while performing work on this project, are under the authority of the Contractor. Other Contractors are to discuss and co-ordinate with, and follow instructions from, the Contractor on all matters of site access, vehicles, deliveries, storage, temporary facilities, coordination with the work of other subcontractors, work methods, scheduling, labour conditions, construction safety, environmental protection, security and all other matters which relate to the safe and proper execution of construction work.
- .9 The Contractor shall ensure that all supervisory personnel on job site are fully aware of the procedures and requirements outlined herein and comply with all requirements specified.
- .10 All contractors are responsible to ensure that all machinery and/or equipment are/is safe and that the workers perform their tasks in compliance with established safe work practices or procedures. Workers must receive adequate training in their specific work tasks to protect their health and safety.
- .11 The Contractor shall be responsible for all persons and companies performing work, including other Contractors, on this project, at all times, up to and including, the date of Substantial Performance of the Work. Authority for coordination and instructions relating to all matters which relate to the safe and proper execution of construction work shall rest with the Contractor. The Contract Price will include the Contractor's fees for the coordination and supervision of the work of all other contractors.
- .12 In addition to the responsibility of all contractors as outlined in 1.1.10, above, Subcontractors will be held accountable for the health and safety of workers under their supervision.
- .13 Every worker must protect his/her own health and safety by working in compliance with the law and with safe work practices and procedures established by the authorities having jurisdiction.
- .14 All sections of the Occupational Health and Safety Act for Industrial Establishments, latest edition, and the Occupational Health and Safety Act for Construction Projects, latest edition, shall be enforced, by the Contractor, in their entirety, throughout the duration of the construction project.
- .15 The Contractor shall provide the Consultant with the telephone number where the Contractor or his representative can be reached at any time, day or night, for the duration of the contract.

- .16 Where an accident, explosion, or fire causes a person injury at the work place, and the worker is disabled from performing the usual task, the Contractor shall prepare a written notice and shall forward same to the Ministry of Labour within four days of the occurrence with a copy to the health and safety representative or the Joint Health and Safety Committee, containing such information and particulars as may be prescribed.
- .1 Where a person is killed or critically injured from any cause at the work place, the Contractor shall immediately call the Ministry of Labour. A written notice from the Contractor shall be given to the Ministry of Labour within forty-eight hours after the occurrence, containing such information and particulars as may be prescribed, with copies to the Consultant and the Owner's Representative.
- .2 The Contractor is advised that the accident scene is under the jurisdiction of the Ministry of Labour and no wreckage, articles, etc., shall be interfered with, disturbed, destroyed, altered or carried away at the scene, or connected with the occurrence, until the Ministry of Labour has given permission.

1.2 REPORT ACCIDENTS

- .1 Promptly report in writing to the Consultant all accidents which cause death, personal injury or property damage, arising out of or in connection with the performance of the work on or adjacent to the site. Where death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Consultant and to the relevant public authorities.
- .2 If any claim is made by anyone against the Contractor or Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Consultant giving full details of the claim.

1.3 FIRST AID FACILITIES

- .1 Provide at the site the equipment and medical facilities necessary to supply first-aid service to anyone who may be injured in connection with the Work, and to conform to the requirements of the authorities having jurisdiction over the Work.

1.4 FIRE SAFETY REQUIREMENTS

- .1 The appropriate clauses of the Ontario Building Code, Ontario Fire Code, National Building Code of Canada and National Fire Code relating to fire safety and protection shall be strictly followed.
- .2 Provide and maintain free access to temporary or permanent fire hydrants acceptable to local fire department.
- .3 Provide sufficient temporary standpipes and connections, fire hose, valves, temporary cabinets, extinguishers, etc. to comply with the requirements of the governing Municipal and Provincial authorities.
- .4 Make necessary adjustments and modifications to temporary fire protection as required during progress of the work. Remove such temporary work when permanent system is installed and operating.

SECTION 01 35 20 - SAFETY REQUIREMENTS

- .5 Conform to "Guidelines for Maintaining Fire Safety During Construction in Existing Buildings", provided by the Office of the Ontario Fire Marshal.
 - .1 Maintain existing exits and access to exits. Where an exit must be blocked, provide an alternate exit acceptable to Authorities Having Jurisdiction.
 - .2 Provide minimum 45 minute rated fire separations at junction between existing corridors in occupied spaces and new corridors under construction. Any required access through these partitions shall be with rated doors, frames with closers and latching.
 - .3 Maintain exiting fire department access route.
 - .4 Do not store combustible materials adjacent to existing building or where such materials could pose a fire hazard to the building or the occupants.
 - .5 Cover existing windows exposed to construction with 16mm gypsum board on steel stud framing, on interior side of such windows.
 - .6 Existing fire alarm system is to be kept operational throughout the construction period. Keep fire department informed of any temporary shutdowns and arrange for alternate fire safety measures to be implemented during that period.
 - .7 Refer to the Ontario Fire Code for requirements for temporary shutdown of fire protection systems, including standpipe system.
 - .8 Modify Fire Safety Plan in accordance with the Fire Code, when required to facilitate construction. Such modifications shall be determined in cooperation with the Owner and the local fire department.

1.5 OVERLOADING

- .1 Ensure no part of Work is subjected to a load which exceeds the design live loads shown on the structural drawings. Ensure that scaffolding and false work are not overloaded. Do not cut load bearing members without approval of Consultant.

1.6 FALSEWORK

- .1 Design and construct falsework in accordance with CSA S269.1 latest version.

1.7 VISITORS

- .1 Provide hard hats for use by all visitors.

1.8 ADDITIONAL REQUIREMENTS FOR OCCUPIED SITES

- .1 School will be occupied throughout the academic year. When school is in session, additional safety requirements will apply, as outlined below.
- .2 Flagman:
 - .1 Provide a full-time flagman during movement of construction equipment and / or materials.

SECTION 01 35 20 - SAFETY REQUIREMENTS

- .2 The location of the Flagman shall be coordinated with the Owner, to ensure the safe guarding of staff, students, and the general public.
- .3 Flagman shall be a designated person, not the Site Supervisor or other construction worker, and shall not be changed during the Project unless approved by the Owner.
- .4 Flagman must have means of communication with Site Supervisor (phone or walkie-talkie).
- .5 Flagman shall meet and escort all construction traffic from the site entrance into and out of the construction area, from street through entrances to hoarding. No unaccompanied construction vehicles will be permitted on School Board property, outside of construction enclosure.
- .6 Flagman shall control construction parking at the school site. Parking shall be as designated by Owner and school Principal.
- .7 Flagman shall be properly outfitted to carry out his duties, with appropriate safety clothing and equipment, including reflective vest, hand-held "Stop" sign and a visible identification tag.
- .3 Access Control:
 - .1 The Contractor shall instruct all suppliers and subcontractors that they are required to contact the Site Supervisor by cell phone prior to entering the site, and await escort by the flagman.
 - .2 Site Supervisor shall then advise the flagman to meet and escort the vehicle.
 - .3 Gates of construction enclosure must remain closed and locked at all times and only opened for the time required for access/egress of authorized vehicles or personnel.
- .4 Site Communication
 - .1 The Contractor shall provide the Owner and Principal with an emergency contact telephone number at which the Site Supervisor or other Contractor representative can be contacted directly during work hours and with voicemail available at all other times, including weekends and holidays, which will be checked regularly.
 - .2 Site Supervisor and flagman must have means of direct communication available at all times during work hours.
 - .3 Contractor shall be in daily communication with the school Principal to determine any activities which may involve safety concerns, whether school related or construction related.

1.9 SIGNAGE

- .1 Provide signage indicating " Danger - Keep Out", "Hard Hats must be worn at all times", "Safety Shoes must be worn at all times", "No Trespassing", etc., mounted on all sides of Site, and additional signs as necessary to adequately warn the public and workmen of the inherent dangers of the site and requirements to maintain personal safety. Safety Signage is also required at all construction entrances.
- .2 During the school year, signage posted at gates shall state restrictions on hours of entry and egress, as agreed to by the Owner and Principal, and under no circumstances shall construction traffic be allowed within 30 minutes prior to school start, during recess, lunch break, and within 30 minutes after school dismissal.

END OF SECTION

PART 1 - GENERAL

1.1 HAZARDOUS MATERIALS

- .1 The Ontario Occupational Health and Safety Act requires the Owner to provide a list of Designated Substances to all prospective Contractors and they in turn must supply the list to their sub-trades who are likely to handle or disturb the material.
- .2 The Owner commissioned a survey of hazardous building materials and identified asbestos and other hazardous materials in the building; refer to the Hazardous Materials Report included in the Supplementary Information Volume.
 - .1 Abatement of hazardous materials is to be carried out under this Contract by a prequalified Abatement Contractor.
 - .2 The cost of abatement work shall be included in the Tender price / bid amount.
 - .3 Additional abatement work not identified in the Tender documents shall be paid for through the Cash Allowances.
- .3 In accordance with the Ontario Health and Safety Act and regulations enacted under the Act the Contractor and sub-trades shall take appropriate precautions for the building and their work force. Such precautions may include, for the substances listed, the measures outlined below.
- .4 Remove, transport, and dispose of hazardous materials in accordance with applicable laws, including the following:
 - .1 Occupational Health and Safety Act, R.S.O. 1990, c. O.1., including the following regulations made under the Act:
 - .1 O.Reg. 213/91, Construction Projects, amended to 345/15 and
 - .2 O.Reg. 278/05, Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations amended 479/10.
 - .2 Regulations for the transport of asbestos waste, including:
 - .1 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
 - .2 Dangerous Goods Transportation Act, R.S.O. 1990, c. D.1
 - .3 Environmental Protection Act, R.S.O. 1990, C. E.19, and regulations under the Act, including:
 - .1 O.Reg. 102/94 Waste Audits and Waste Reduction Work Plans
 - .2 O.Reg. 103/94 Industrial, Commercial and Institutional Source Separation Programs
 - .3 R.R.O. 1990, Reg. 347: General - Waste Management
- .5 Where a friable building material is found enclosed in a wall, floor or ceiling such as fireproofing, insulation on pipe or ducts etc. (that is not fibrous glass) or an acoustical textured material (stucco) or a non-friable material such as cement board or cement pipe, the Contractor shall refer to the Consultant who shall contact the Owner for further direction.

01 35 43 - HAZARDOUS MATERIALS

- .6 Prior to the disposal of building materials a leachate toxicity test in compliance with Water Management Regulation (Revised Regulation of Ontario 1990/Regulation 347) may be required by the local waster receiving site or the Ontario Ministry of Environment and Energy. Prior to disposal these authorities should be consulted with, and tests performed where required.

END OF SECTION

PART 1 - GENERAL

1.1 REGULATING DOCUMENTS

- .1 Conform to the Ontario Building Code (Ontario Reg. 332/12), Ontario Fire Code (Ontario Reg. 213/07), Accessibility for Ontarians with Disabilities Act (Ontario Reg. 191/11), National Building Code of Canada 2010, 2012 Canadian Electrical Code (CEC), CSA B44 - Safety Code for Elevators and Escalators, CSA W59 - Welded Steel Construction, The Occupational Health and Safety Act, Ontario (R.S.O. 1990), the National Fire Code, the local municipal Fire Code, and all other applicable Codes and Building By-Laws. Conform to the requirements of the authorities having jurisdiction, such as public utilities. Where required under The Occupational Health and Safety Act, engage a Professional Engineer to design formwork and falsework for concrete.
- .2 Contract forms, codes, standards and manuals referred to in these specifications are the latest published editions at the date of close of tenders. Meet or exceed requirements of specified standards.
- .3 Provide copies of documents referred to in the Specification for joint use of Contractor and Consultant, on site.

1.2 DOCUMENTS REQUIRED BY BUILDING INSPECTOR

- .1 Confirm with building inspector, at the commencement of construction, what documents are required for submission both during construction and for occupancy. Keep copies of such documents on site.
- .2 At the time of request for occupancy, submit a complete package of all required documents to the building inspector. The package shall contain all documents required for the inspector's sign off for occupancy, and should be expected to include the following documents:
 - .1 Copies of Consultant's General Review Reports
 - .2 Copies of General Review Reports of consulting engineers
 - .3 Consultant's and engineers' letters confirming project is ready for occupancy in accordance with the provisions of the Ontario Building Code, Division C, section 1.3.3, Occupancy of Buildings.
 - .4 Structural steel inspection reports certifying conformance to CSA Standards S16, S136 and A660.
 - .5 Concrete testing reports and inspection reports for reinforcing steel.
 - .6 Roof inspection reports.
 - .7 Verification of compliance with tested designs for rated assemblies.

SECTION 01 41 00 - REGULATORY REQUIREMENTS

- .8 Verification of Fire Protection Systems including:
 - .1 Verification of engineer supervised sprinkler, standpipe and hose system testing.
 - .2 Material and test certificates for all work, including below ground, in conformance with NFPA-13 and NFPA-14, as applicable.
- .9 Verification of Fire Alarm System as follows:
 - .1 Testing to CAN/ULC S537
 - .2 Installation to CAN/ULC S524
 - .3 Monitoring to CAN/ULC S561
- .10 Additional documents as required by the municipality.

END OF SECTION

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- .1 Refer also to the Quality Control Provisions of Section 00 10 00, General Instructions.
- .2 Provide a system of quality control to ensure that the minimum standards specified herein are attained.
- .3 Bring to the attention of the Consultant any defects in the work or departures from the Contract Documents which may occur during construction. The Consultant will decide upon corrective action and state recommendations in writing.
- .4 The Consultant's general review during construction and inspection by independent inspection and testing agencies reporting to the Consultant are both undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve him of contractual responsibility.

1.2 NOTIFICATION

- .1 Give the Consultant advance notice of shop fabrication, field erection and other phases of the work so as to afford him reasonable opportunity to inspect the work for compliance with contract requirements. Failure to meet this requirement may be cause for the Consultant to classify the work as defective.

1.3 DEFECTIVE MATERIALS AND WORKMANSHIP

- .1 Where factual evidence exists that defective workmanship has occurred or that work has been carried out incorporating defective materials, the Consultant may have tests, concrete cores, inspections or surveys performed, analytical calculation of structural strength made and the like in order to help determine whether the work must be replaced. Tests, inspections or surveys carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may indicate that, in the Consultant's opinion, the work may be acceptable.
- .2 All testing shall be conducted in accordance with the requirements of the Ontario Building Code, except where this would, in the Consultant's opinion, cause undue delay or give results not representative of the rejected material in place. In this case, the tests shall be conducted in accordance with the standards given by the Consultant.

END OF SECTION

PART 1 - GENERAL

1.1 TEMPORARY TELEPHONE AND INTERNET SERVICES

- .1 Install and pay for all telephone and internet services for Contractor's own use, and for the Owner's and Consultant's use.
- .2 Refer also to Section 01 52 00, Construction Facilities.

1.2 POWER AND WATER SUPPLY

- .1 Provide all temporary light and power complete with all wiring, lamps and similar equipment as required for completion of the Work. Provide adequate lighting for all workmen, sufficient for safety and for execution of good workmanship, taking particular care to observe all safety requirements. Adequate temporary lighting will be insisted upon. The Owner will not be liable for any loss, damage, delay, or claims for extra costs resulting from lack of services.
- .2 Existing building services may be used, as available. This does not include emergency generators or batteries.
- .3 Provide an adequate pure fresh water supply for the use of trades. Run supply pipe from nearest available source and maintain in good condition until the permanent system is installed and ready for use. Provide a sufficient number of faucets on each floor.
- .4 Ensure continued water and power supply to school throughout the construction period. Arrange for temporary services, including approvals from authorities having jurisdiction, where any interruption is anticipated.

1.3 TEMPORARY HEATING AND VENTILATION

- .1 Furnish heating apparatus and fuel for heating, if required.
- .2 Provide for the proper heating and drying out of the work when building systems are unavailable, until the completion of the heating system work, by the use of approved portable heating equipment. The use of Salamanders or other open flame type heaters will not be permitted.
- .3 Provide sufficient temporary piping and temporary unit heaters or radiators or other suitable heating equipment to maintain all parts of the enclosed work at not less than 15°C. or higher if required by any finishing trade. Maintain strict supervision of operation of temporary heating and ventilating equipment. The Contractor shall be fully responsible for damage caused by temporary heating equipment, such as smoke or overheating.
- .4 Maintain sufficient ventilation to prevent build up of moisture and condensation, to enable the work of the finishing trades to be correctly applied. Provide adequate ventilation during and after operation involving materials or processes involving potentially harmful fumes or odours.
- .5 Provide local exhaust ventilation to prevent harmful accumulations of hazardous substances into atmosphere of occupied areas. Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

SECTION 01 51 00 - TEMPORARY UTILITIES

- .6 Ventilate storage spaces containing hazardous or volatile materials. Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements. Store paints & solvents in secure, locked, ventilated room at all times.
- .7 Upon completion of the work, the heating equipment and system shall be thoroughly cleaned, tested and put into operation and turned over to the Owner in perfect condition; after approval by the Consultant and their Consulting Engineers. All warranties must be valid from date of Substantial Performance of the Contract, except in the case of partial occupancy where it shall be date of occupancy.
- .8 Maintain strict supervision of operation of temporary heating and ventilating equipment.
 - .1 Enforce conformance with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.

1.4 REMOVAL OF TEMPORARY UTILITIES

- .1 Remove temporary utilities from site when directed by Consultant and/or at the completion of the project.

1.5 FIRE EXTINGUISHERS

- .1 An adequate number of ABC type fire extinguishers shall be provided for the protection of the work during construction.

END OF SECTION

PART 1 - GENERAL

1.1 CONTRACTOR'S SITE OFFICE

- .1 Site office may be located within existing school during months of July and August in location provided by Owner. Contractor shall provide Site Office trailer at all other times.
- .2 The site office shall be furnished by Contractor with the following as a minimum requirement:
 - .1 Desk and chair
 - .2 File cabinets as required for storage
 - .3 Plan file for storage of drawings
 - .4 Table and stacking chairs to provide seating at job meetings
 - .5 Telephone and fax machine, or other acceptable means of communication as noted below.
- .3 Mobile telephone will only be accepted in place of site telephone if the contact number for the site is available at all times when construction personnel are on site, and subject to acceptance by Owner and Consultant.
- .4 A printer and computer (or equivalent) may be accepted in lieu of a fax machine on site, subject to acceptance of provisions by Owner and Consultant.
- .5 The Contractor shall maintain the following documents, up-to-date, in site office:
 - .1 Contract Documents
 - .2 Reviewed shop drawings
 - .3 All instructions and change documents, ie Work Authorizations, Jobsite Instructions, Notices of Contemplated Change, Change Orders
 - .4 All inspection and test reports
 - .5 Permit drawings and specifications
 - .6 As-built drawings

1.2 STORAGE SHEDS

- .1 Provide adequate weather-tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.
- .2 Storage sheds shall be painted and doors shall be fitted with locks.
- .3 Locate storage sheds adjacent to building away from road to approved of the Consultant.
- .4 Material stored on site must be protected by tarpaulins until enclosed in building.
- .5 The Owner takes no responsibility for any items stored in the existing building. Any rooms used for storage must have all surfaces repaired, cleaned, and repainted prior to occupancy of the building.

SECTION 01 52 00 - CONSTRUCTION FACILITIES

1.3 SANITARY FACILITIES

- .1 One existing washroom in the work area will be designated for contractor use in July and August only. Provide portable sanitary facility at all other times. Maintain washroom in clean and sanitary condition.
- .2 If building services are unavailable at any time, furnish and maintain in a sanitary condition, suitable sanitary facilities containing adequate sanitary accommodation for all workmen in accordance with local Municipal and Provincial sanitary regulations, and to the approval of Public Health Authorities and the Consultant, with all necessary water, sewage, light and heat supplied in sufficient quantity. The use of single portable serviced units will be permitted providing siting is approved.
- .3 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.4 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Consultant and/or at the completion of the project.

END OF SECTION

PART 1 - GENERAL

1.1 SITE PROTECTION

- .1 Supply, install and maintain all guard rails, barriers, night lights, sidewalk and curb protection as may be necessary or as the by-law may require.
- .2 Supply, install and maintain all necessary temporary doors, screens and coverings to protect work areas. All such work shall be neatly painted. Doors shall have hasp and substantial padlock. Owners representative shall have key or combination where access is required. Provide and maintain temporary fencing at excavations, etc. as required for safety. Protect existing asphalt and concrete paving and curbs from damage and make good any damage at completion of project.
- .3 Protect all of the work from damage by the elements.
- .4 Properly protect floors and roofs from any damage. Take special precautions when moving heavy loads or equipment over floors and roofs.
- .5 Keep floors free of oils, grease or other such materials likely to discolour them and/or affect bonding of applied surfaces.
- .6 Ensure that no part of the Work is loaded greater than it was designed for, when completed. Make any temporary support as strong as the permanent support. Place no load on concrete structure until it has sufficient strength to safely bear such load.
- .7 Protect glass and other finishes against heat, slab and weld splatters, using appropriate protective shields and covers.
- .8 Provide and maintain, in good working order, appropriately labelled ULC fire extinguishers, to the approval of Authorities Having Jurisdiction.
- .9 Provide a minimum of two safety helmets on site at all times for the use of any other Owner authorized visitors to the site. It is the Contractor's responsibility to make certain that any such visitors wear the protective headgear and any other safety gear which may be necessary at that particular time of construction.
- .10 Should the job be stopped for any cause, the Contractor shall be responsible for and provide all necessary protection to prevent damage by weather or other cause until the cause of stoppage has been cleared.
- .11 The Contractor shall be entirely responsible for supervision of project and for protection of public from vehicles in movement, stockpiled materials and construction.
- .12 The Contractor is responsible for the prevention of vandalism and theft of all tools, equipment and materials.
- .13 Any damage to roadways must be repaired immediately, to municipal standards.
- .14 The Contractor is responsible for snow removal on sidewalks adjacent to work areas and all are as required for access to site.

SECTION 01 56 00 - TEMPORARY BARRIERS AND CONTROLS

- .15 Any damage to site by the Contractors forces, delivery vehicles, etc., must be made good at the end of the job. Similarly any damage to curbs, sidewalks, or other municipal property shall be made good by the Contractor.

1.2 TEMPORARY DUST CONTROLS, DUST PROOF PARTITIONS, FIRE RATED PARTITIONS

- .1 Supply and install dust proof fire rated partitions, hollow metal door and frame in the occupied school at corridors doorways abutting new work prior to any work taking place. Call for review by Owner/Consultant after dust proof partitions are installed.
- .2 Dust proof partitions shall consist of 92mm steel stud framing to the underside of deck with one layer of 13mm plywood sheathing covered by 10 mil polyethylene sheet caulked all around the partition covered by two layers of 16mm Type X gypsum board with off set joints taped and filled. The gypsum board will be painted with two coats of good quality white paint.
- .3 Dust proof partitions shall be erected outside of school operating hours and shall remain in place until the new Work is ready for occupancy, and accepted by the Owner.
- .4 Place filters in return air vents in all work areas to prevent dust from entering the existing HVAC system.
- .5 Ensure interior of all new ductwork is cleaned before connection to the existing HVAC system and commencement of operation of new system components. If system is put into operation before work is complete in any area, provide temporary filters in return air vents and grills.
- .6 Minimize the amount of dirt tracked into the existing building. Provide mats at all entrances used by construction personnel to enter the school.
- .7 Keep dust, dirt, and debris away from fresh air intakes, open doors and windows, and from areas where it could be tracked into the building by students, staff, or visitors to the school. Assume responsibility for cleaning up all dirt, debris, mud, water, etc., tracked in by construction personnel.

1.3 MAINTAINING INDOOR AIR QUALITY

- .1 Smoking is not permitted inside the building or on the school property at any time. The Contractor shall post "No Smoking" signs throughout the work areas to enforce this requirement.
- .2 Minimize the time that vehicles are left idling on site. Keep idling vehicles away from open doorways and windows, open areas of the building addition, fresh air intakes, and areas where students are gathered.
- .3 All adhesives, sealants, paints and coatings applied onsite must be low VOC products.
- .4 Products requiring the use of adhesives, sealants, paints and other coatings, are to be assembled offsite as much as possible. Such adhesives, sealants, and coatings shall be low VOC products, where suitable products are available.
- .5 No toxic chemicals or fuels are permitted to be stored inside the building.

SECTION 01 56 00 - TEMPORARY BARRIERS AND CONTROLS

- .6 Refueling of equipment is to be undertaken outside the building.
- .7 Gas powered equipment is not to be used inside the building. Use electric or propane powered equipment only, and to acceptance of Owner and Consultant.

1.4 SECURITY

- .1 The Contractor shall be entirely responsible for supervision of project and for protection of public from vehicles in movement, for stockpiled materials and construction. Vehicular parking and stockpile materials must be maintained on the construction site only. No street parking or stockpiling will be allowed on the Municipal streets.
- .2 The Contractor is responsible for the prevention of vandalism and theft of all tools, equipment and materials until date of Substantial Performance of Contract.
- .3 The Contractor shall provide 24 hour surveillance on site from date of Substantial Performance to date of acceptance and occupancy by the Owner.

1.5 REMOVAL OF TEMPORARY BARRIERS

- .1 Remove temporary barriers and enclosures from site when directed by Consultant and/or at the completion of the project.

END OF SECTION

PART 1 - GENERAL

1.1 LAYOUT

- .1 At the time of mobilization or immediately thereafter, the Contractor is to confirm in writing that the site is visually in general conformance with the description in the documents.
- .2 Report any dimensional discrepancies immediately to the Consultant, and confirm as soon as possible any job measurements required for shop drawings, etc. Co-ordinate all trades, including mechanical and electrical.

1.2 DIMENSIONS

- .1 Ensure that necessary job dimensions are taken and trades are co-ordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of dimensions and for all co-ordination.
- .2 Verify that work is executed in accordance with dimensions indicated, that levels and clearances are maintained, and that work installed in error is rectified before construction continues.
- .3 Check and verify all dimensions including interfacing of services. Dimensions, when pertaining to the work of other trades, shall be verified with the trade concerned. Ensure that all Subcontractors co-operate for the proper performance of the work.
- .4 Do not scale directly from the drawings; this applies all drawings, whether in paper or digital format. If there is ambiguity or lack of information, immediately inform the Consultant. Any change caused by lack of such review shall be the responsibility of the trade concerned.

1.3 SITE VERIFICATION

- .1 Include costs to X-Ray floors and surfaces which are to be cut to accommodate new work.
- .2 Coordinate with forces performing demolition work.

END OF SECTION

PART 1 - GENERAL

1.1 CUTTING AND PATCHING

- .1 Before cutting, drilling or sleeving load-bearing elements, obtain approval of location and method.
- .2 Do not endanger work or property by cutting, digging, or similar activities. No trade shall cut or alter the work of another trade who has installed it unless approved by that trade.
- .3 Cut and drill with true smooth edge to minimum suitable tolerances.
- .4 Fit construction tightly to ducts, pipes and conduit to stop air movement completely. The trade performing work that penetrates a fire, air, vapour, moisture, thermal or acoustic separation element of the building shall pack voids tightly with insulation, rated where required; seal air, vapour and moisture barriers; and caulk joints as may be required to ensure that no air movement through the penetration is possible.
- .5 Cutting, drilling and sleeving of work shall be done only by the trade who has installed it. The trade requiring drilling and sleeving shall inform the trade performing the work of the location and other requirements for drilling and sleeving. The Contractor shall directly supervise performance of cutting and patching.
- .6 Replace and/or make good damaged work.
- .7 Patching or replacement of damaged work shall be done by the subcontractor under whose work it was originally executed, and at the expense of the subcontractor who caused the damage.

1.2 CONCEALMENT

- .1 Conceal all conduit pipes, ducts and wiring in finished areas except where indicated otherwise. This includes new work in existing building.
- .2 Where furring out is required, use material similar to adjacent surfaces except where indicated otherwise.
- .3 All new horizontal runs of ducts, pipes and conduits shall be concealed in ceiling spaces.
- .4 All new duct drops and risers shall be concealed in ceiling spaces, bulkheads or furred out duct shafts. All new pipe and conduit drops and risers shall be buried in walls. New devices in walls shall be recessed.

1.3 MECHANICAL AND ELECTRICAL EQUIPMENT

- .1 Mechanical and Electrical services must be temporarily capped or terminated to permit renovation in existing areas to proceed.

SECTION 01 73 00 - EXECUTION

- .2 Cutting of holes up to 100mm in size in the existing structure and surfaces required by the trades shall be by those Subcontractors. Cutting and patching of openings greater than 100mm in size shall be by the Contractor in co-ordination with the trades. PATCHING OF ALL HOLES IN EXPOSED FINISHED SURFACES SHALL BE BY THE CONTRACTOR. Mechanical and Electrical trades shall do their own coring of existing slabs as required.

1.4 BLOCKING UP OF EXISTING OPENINGS

- .1 At existing openings in walls shown to be blocked up, masonry shall be used to provide required ratings, unless otherwise noted.

1.5 NEW OPENINGS IN EXISTING WALLS

- .1 Where new openings are shown to be cut into existing walls, provide new lintels over the opening and patch all adjacent materials. This includes new openings with lintels for Mechanical trade.

1.6 EXISTING CEILINGS

- .1 Existing ceiling components and ceiling mounted fixtures and equipment shall be carefully removed as required for new services and reinstalled when work is complete.
- .2 Any existing ceiling tiles, which are removed for services or new connections shall be replaced with new tiles. Existing tiles shall be turned over to the Owner's staff if in good condition. Transfer any markings for services from existing to new tiles.
- .3 Where new walls are constructed, remove ceilings and grid and replace with new.
- .4 Replace existing ceilings with new where indicated on drawings.
- .5 Existing ceilings are part of a one hour rated roof assembly; all new components to be fire rated.

1.7 FINISHES ON EXISTING FLOORS

- .1 Floors of existing building must be finished flush, ready for final finish in areas affected by the work.
- .2 Existing concrete floors shall be prepared according to manufacturers instructions for new adhesive applied finishes.
- .3 Existing floor finishes shall be removed and old adhesive removed from the existing concrete slab by scraping or solvent, in accordance with Health & Safety requirements. Grinding of floor finishes will not be accepted.
- .4 Where new walls are being constructed, and new flooring is not called for in the Room Finish Schedule, remove floor finish below wall to extent required for work, unless indicated otherwise on drawings. Only full tiles are to remain.

1.8 GENERAL NOTES

- .1 Refer to the Door Schedule, and the Room Finish Schedule, and general notes below.

- .2 Junction of different floor finishes shall occur on centre line of doors.
- .3 All masonry and drywall shall be extended to u/s steel deck. Where walls run parallel and under OWSJs the OWSJs shall be enclosed both sides with gypsum board to provide sound barrier between rooms. Fill with minimum 100 mm acoustic batt insulation.
- .4 All structural steel supporting structure shall be spray fireproofed 1 hr.
- .5 All exposed concrete block corners shall be bullnose block.
- .6 Hardware shown on Door Schedule refers to code requirements only. Refer to Hardware Schedule for total hardware required.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 Conduct cleaning and disposal operations to comply with local ordinances, anti-pollution laws, and recommendations of Construction Safety Association.
- .2 Store volatile wastes in covered metal containers, and remove from premises daily.
- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.
- .5 Provide instructions designating proper methods and materials to be used in final cleaning of Work.
- .6 Do not bury or burn any rubble, waste or packaging, or surplus materials. No dumping of waste, such as oil or paint, into sewers will be permitted.
- .7 Dispose of waste materials in accordance with the Environmental Protection Act, R.S.O. 1990, C. E.19, and regulations under the Act, including:
 - .1 O.Reg. 102/94 Waste Audits and Waste Reduction Work Plans
 - .2 O.Reg. 103/94 Industrial, Commercial and Institutional Source Separation Programs
 - .3 R.R.O. 1990, Reg. 347: General - Waste Management

1.2 MATERIALS

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

1.3 POLLUTION CONTROL

- .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. Remove mud deposited on public roads. Provide mud mats at all site access roads.
- .2 Prevent dust nuisance to adjacent properties, existing intermediate school, and general public by taking appropriate pollution control measures as directed by Consultant.
- .3 Include daily watering of site to maintain dust control as part of tender submission.

1.4 DISPOSAL OF WASTES

- .1 Burying of rubbish and waste materials on Site not permitted.
- .2 Disposal of waste or volatile materials, such as mineral spirits oil or paint thinner into storm or sanitary sewers prohibited.
- .3 Meet Ministry of the Environment Standards and Guidelines.

SECTION 01 74 00 - CLEANING AND WASTE MANAGEMENT

1.5 FIRES

- .1 Fires and burning of rubbish on Site is not permitted.

1.6 CLEANING DURING CONSTRUCTION

- .1 Maintain entire site and adjoining municipal and/or private property free from accumulations of waste materials and rubbish. Do not allow rubbish to accumulate in work under construction or on roofs. Clean site daily.
- .2 Maintain entire site free from accumulations of snow and ice.
- .3 Provide on-site containers for collection of waste materials, and rubbish. Empty containers on a regular basis in conformance with Municipal and Provincial Regulations.
- .4 Cleaning operations shall include those areas used for temporary site access or used on a temporary basis to facilitate the Work.
- .5 Broom clean and vacuum areas as required for application of finishes. Continue to clean on an "as needed" basis and insure that areas which receive paint, floor tile and other critical finishes are kept dry, dust free, and at acceptable temperatures.
- .6 Keep all areas of the Work clean and orderly, free from accumulation of dirt, debris, garbage, oily rags, excess material, or such other trash items. Remove such items from all areas of the Work on a daily basis.
- .7 Vacuum and/or broom interior building areas when ready to receive painting and other finishes. Continue cleaning on an "as needed" basis until the building is ready for final review and take-over.
- .8 Schedule cleaning operations so that resulting dust and other contaminants do not affect wet, newly painted surfaces, or newly installed equipment, or devices.

1.7 CLEANING AT COMPLETION OF WORK

- .1 Employ a professional cleaning company to thoroughly clean all areas immediately prior to occupancy of the Work by the Owner. Cleaning company shall be an established firm, bonded and fully insured, and acceptable to the Owner.
- .2 Provide manufacturer's printed cleaning and maintenance instructions to cleaning company. All finishes, equipment, fixtures, and other surfaces are to be cleaned in accordance with the product manufacturer's recommendations.
- .3 Use cleaning products which are non-toxic, environmentally friendly products, and which will not leave residues or odours on surfaces.
- .4 Do not apply sealers, wax, or polish to any flooring without the expressed permission of the Owner. All such products, and the methods of application, must be approved in advance by the Owner.
- .5 Remove all temporary protective coverings provided during construction.

SECTION 01 74 00 - CLEANING AND WASTE MANAGEMENT

- .6 Remove all protective film from switchplates and hardware, particularly kick plates. Remove miscellaneous labels from hardware, fixtures, equipment, and appliances, etc.
- .7 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all exposed interior and exterior finishes, including glass and other polished surfaces. Clean glass both sides. Vacuum inside all cabinets and drawers and leave millwork ready for use. Remove paint spots and smears from all surfaces, including hardware.
- .8 Remove stains, spots, marks and dirt from decorated work, electrical and mechanical fixtures, and the like. Remove protective materials.
- .9 Clean hardware, aluminum, stainless steel, and other metal surfaces.
- .10 Clean resilient and sheet flooring and all floor and wall tile.
 - .1 Vinyl composition tile (VCT) is to be broom swept only. The Owner will wash, wax, and polish VCT floors, and other resilient floors which require a wax finish.
 - .2 Clean no-wax resilient flooring in accordance with manufacturer's instructions.
- .11 Clean lighting reflectors, lenses and other lighting surfaces.
- .12 Clean all plumbing fixtures and fittings, including those located inside cabinetry or otherwise hidden from continuous view.
- .13 Vacuum clean all new carpeting, and all existing building interiors affected by construction operations.
- .14 Remove debris and surplus materials from the roof areas and accessible concealed spaces.
- .15 Replace heating, ventilation and/or air conditioning filters at Substantial Performance, whether or not the units were operated during construction operations. If any units were operated without filters, clean ducts, blowers, and coils.
- .16 Broom clean all asphalt and concrete paved surfaces and rake clean other disturbed surfaces in the area of the Work, to remove site debris caused by the Work of this Contract. Inspect for damages and make good.
- .17 Remove any snow or ice from walks and paved areas, prior to occupancy.
- .18 Ensure that all clean up operations specified in other sections has been performed.
- .19 Conduct final inspection of interior and exterior surfaces, and concealed spaces.
- .20 Leave premises ready for immediate occupation without further cleaning, all to the Consultant's approval.

SECTION 01 74 00 - CLEANING AND WASTE MANAGEMENT

1.8 REPAIR WORK

- .1 All equipment, including mechanical and electrical equipment, shall be turned over in "as new" condition. Repair any damage, including dents and scratches. Repaint or touch up paint finish as necessary to return to new condition.
- .2 Replace all broken glass.
- .3 Repair any damage incurred during cleaning operations.

END OF SECTION

PART 1 - GENERAL

1.1 TAKEOVER PROCEDURE

- .1 Subject to detailed instructions included in these specifications, conform to OAA/OGCA document 100, Take-Over Procedures.

1.2 OCCUPANCY REQUIREMENTS

- .1 Review occupancy with the building inspector well in advance of required occupancy date, and ensure that the requirements are met for occupancy, including all document submissions. Refer also to Section 01 41 00, Regulatory Requirements.
- .2 An occupancy permit is required for any project that is not deemed complete prior to the date of occupancy.
- .3 Refer to OBC Division C, section 1.3.3, Occupancy of Buildings, for occupancy requirements. The designated building official is required to issue an occupancy permit only under the conditions outlined therein. Generally, these conditions include the following:
 - .1 Completion of building structure and walls to the roof;
 - .2 Completion of all required fire separations and closures in all areas to be occupied;
 - .3 Completion of all required exits and fire separations, including all doors and hardware, and exit signs, at all levels of floor areas to be occupied;
 - .4 Completion of all shafts to rated assemblies above occupied area, complete with fire separations.
 - .5 Completion of HVAC, power and lighting for all areas to be occupied, including emergency lighting;
 - .6 Completion of fire safety systems for areas to be occupied, including sprinklers, standpipe, fire extinguishers, fire alarm system, and exterior fire route;
 - .7 Maintenance of egress routes to and from areas to be occupied, keeping them free of materials that could present hazards to access; and
 - .8 Secure and safe separation of areas to be occupied from areas that are incomplete and not to be occupied.
- .4 In addition to the OBC requirements for occupancy, the spaces must be complete for the purposes of occupancy by the Owner.
- .5 The issue of an occupancy permit shall not imply Substantial Performance of the Contract. Determination of Substantial Performance is defined by lien legislation.

1.3 ACTION REQUIRED AT OCCUPANCY

- .1 When of the opinion that the Occupancy Requirements have been met, perform an inspection of the work, accompanied by the major subcontractors. Submit an inspection report, confirming that the occupancy requirements have been met, to the Consultant and the Owner.
- .2 Arrange for and pay related fee for all necessary inspections required for occupancy such as Hydro, Fire Department and Building Department.
- .3 Confirm with the building inspector that the occupancy requirements of the municipality have been met, and submit evidence of such to the Consultant and Owner.

SECTION 01 77 00 - CLOSEOUT PROCEDURES

- .4 Next, arrange for a review of the Work with the Consultants and Owner. The Consultant will determine whether the Work is Fit for Occupancy.
- .5 Request letters confirming General Review from Consultant, and Structural, Mechanical and Electrical Engineers, for submission to Authorities Having Jurisdiction.
- .6 Upon receipt of the required documents, confirm that occupancy of the Work is accepted by the Authorities Having Jurisdiction. Submit evidence of the permission for occupancy to the Consultant and Owner.
- .7 When partial occupancy of uncompleted project is required by the Owner, co-ordinate the Owner's uses, requirements and access with the construction requirements to complete project.

1.4 ACTION REQUIRED AT SUBSTANTIAL PERFORMANCE

- .1 Perform the actions listed below prior to issue of the Certificate of Substantial Performance of the Contract.
- .2 Submit the documents and material detailed in section 01 78 00, Closeout Submittals. Deliver all required submittals to the Consultant for approval PRIOR to Substantial Performance of the Work. Final payment will not be made until all these items have been received and approved.
- .3 Prior to applying for a Certificate of Substantial Performance, perform an inspection in accordance with OAA/OGCA Document 100, Stage 2, Contractor's Inspection for Substantial Performance. Submit a copy of the deficiency list to the Consultant.
- .4 Ensure all sub-systems ie fire alarm, security, E.M.S., are fully operational prior to Substantial Performance.
- .5 When of the opinion that the requirements for Substantial Performance have been met, submit an application for a Certificate of Substantial Performance to the Consultant. The application shall be as outline for Stage 3 of the OAA/OGCA Take-Over Procedures.
- .6 Expedite and complete deficiencies and defects identified by the Consultant. Final Certificate for Payment will not be issued until all deficiencies are satisfactorily corrected, inspected, and approved by the Consultant, and all documentation has been handed to the Consultant.
- .7 Remove all protection erected, and make good all damage to the Work and adjoining Work due to the lack or failure of such protection. In addition, all debris, surplus materials tools equipment shall be removed from the work areas and the site, and the Project shall be left clean and tidy to the full and complete satisfaction of the Consultant and Owner.
- .8 Perform final adjustment of Cash Allowance, specified in Section 01 10 00, General Instructions.
- .9 Arrange for Consultant to prepare CAD drawing files for the Board using the final as-built drawings. In addition, have the Consultant prepare an updated Project Manual, in WordPerfect format.

SECTION 01 77 00 - CLOSEOUT PROCEDURES

- .10 At time of Substantial Performance, instruct the Owner's personnel in operation, adjustment and maintenance of equipment and systems, using operation and maintenance manuals as the basis for instruction.
- .11 Prior to final site review, start up and demonstrate operation of all systems to the Owner and the Consultant.
- .12 Review cash and contingency allowances in relation to contract price, change orders, hold-backs and other contract price adjustments.
- .13 Review inspection and testing reports to verify conformance to the intent of the documents.
- .14 Review condition of all equipment, which has been used in the course of the Work to ensure turnover at completion in "as new condition" with warranties, dated and certified from time of Substantial Performance of the Contract.
- .15 When partial occupancy of uncompleted project is required by the Owner, co-ordinate the Owner's uses, requirements and access with the construction requirements to complete project.
- .16 Provide on-going review, inspection, and attendance to building call back, maintenance and repair problems during the warranty periods.
- .17 Continue to submit monthly deficiency status reports, as specified in Section 01 32 00, Construction Progress Documentation.

1.5 TOTAL PERFORMANCE

- .1 Upon completion of all items noted on the deficiency list, clean all areas, surfaces, and components affected by corrections and completion of deficient items.
- .2 Ensure that all services, equipment, and apparatus are properly tested and adjusted.
- .3 Letter of Completion:
 - .1 Submit a Letter of Completion to the Consultant stating that the Contract is complete, that all deficiencies identified by the Consultant, Subconsultants, Inspectors and Owner have been rectified, and requesting final reviews by Consultant and Subconsultants.
 - .2 Sign and return deficiency lists, issued by Consultant and Subconsultants, to confirm completion of all deficiencies identified thereon.
- .4 Final Site Review:
 - .1 Consultant will conduct one site review for Total Performance, within ten (10) working days of the request by the Contractor. Should the Contractor fail to provide the Letter of Completion, the Consultants will be under no obligation to perform a site review within the above noted time.

SECTION 01 77 00 - CLOSEOUT PROCEDURES

.2 Additional site reviews, as requested by the Contractor or as necessitated due to the Contractor's failure to complete work as required, shall be paid for by the Contractor at a rate of \$500 per visit, per consultant, plus the cost to prepare additional site review reports at per diem rates (rates as recommended by the OAA or PEO, or as negotiated in advance).

.5 Submit a final request for payment, incorporating all approved changes to the Contract price, and adjustments to the Cash Allowance.

.6 Final Certificate for Payment will not be authorized until all deficiencies are satisfactorily corrected, reviewed and signed off by the Consultant, and required submittals have been completely and accurately provided.

1.6 WARRANTY PERIOD

.1 The Warranty Period on this Project will expire **twelve (12) months** from the date of Substantial Performance of the Work, except for extended warranties as called for throughout the Specifications or equipment not certified by Consultant at time of Substantial Performance.

1.7 UTILITY CHARGES

.1 The Owner will retain responsibility for utility service billings for the building.

END OF SECTION

PART 1 - GENERAL

1.1 SUBMITTALS REQUIRED FOR OCCUPANCY

- .1 Refer to Section 01 41 00, Regulatory Requirements for documents required to be submitted to Authorities having Jurisdiction, for occupancy.

1.2 SUBMITTALS REQUIRED AT SUBSTANTIAL PERFORMANCE

- .1 Prior to Substantial Performance of the Contract, perform the actions detailed in section 01 77 00, Closeout Procedures, and submit the following documents and materials:
 - .1 Deficiency list prepared by Contractor for both interior and exterior areas of the project.
 - .2 Certificates of good standing from the Workplace Safety & Insurance Board for the Contractor and all Subcontractors
 - .3 Operations and Maintenance Manuals, including warranties
 - .4 One complete set of final approved Shop Drawings (bound separately) indicating corrections and changes made during fabrication and installation
 - .5 Keys and construction cores
 - .6 Maintenance materials
 - .7 As-Built Documents as specified in Section 01 33 00, Submittal Procedures
 - .8 Mechanical documents such as valve charts, frames as specified - refer to Divisions 21, 22, 23 and 25.
 - .9 Electrical panel directories (typed and mounted in panels) - refer to Division 26.
 - .10 Balancing Report for Ventilation System.
 - .11 Inspection Certificates required by Provincial, Municipal and other authorities having jurisdiction.
- .2 Deliver all required submittals to the Consultant for approval prior to Substantial Performance of the Work. Final payment will not be made until all these items have been received and approved.

1.3 MAINTENANCE MANUALS

- .1 At Substantial Performance submit to Consultant one hard copy and one digital copy of Architectural, Mechanical, and Electrical Operations Data and Maintenance Manuals made up as follows:
 - .1 Bind data in vinyl hard covered, three-ring loose leaf binders for 212.5mm x 275mm (8-1/2" x 11") size paper. Digital copy shall be submitted in pdf (portable document format) on a single USB flash drive with label or tag identifying project.

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

- .2 Enclose title sheet, labelled "Operation Data and Maintenance Manual - Architectural, CRESTWOOD SECONDARY SCHOOL - MECHANICAL UPGRADES - 2021", date and list of contents. Enclose similar sheet labelled Mechanical and Electrical in applicable manuals. Include the following information:
 - .1 name of project
 - .2 name of Owner
 - .3 name of Consultant
 - .4 name of Contractor
 - .5 date of Substantial Performance.
- .3 Organize contents into applicable sections of work to parallel project specification break-down. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .4 All data related to a section of work or product shall be grouped together, except for shop drawings, unless otherwise requested by the Owner. Confirm method of organization with Owner prior to assembling manuals. Typically, each section shall be organized, as applicable, as follows:
 - .1 General information; identify section of work, subcontractor(s) responsible
 - .2 Warranty
 - .3 Guarantees, Bonds
 - .4 Schedules (hardware, paint)
 - .5 Product data sheets
 - .6 Material safety data sheets (MSDS)
 - .7 Operating manual
 - .8 Maintenance instructions
 - .9 Receipts for maintenance materials, keys, etc.,
 - .10 Maintenance contracts (applicable to elevator, wheelchair lift, planting, sod, etc.)
 - .11 Inspection and testing reports
- .2 Provide one copy of each of the following in the first binder:
 - .1 Contractor's final statutory declaration on CCDC form 9A-2001
 - .2 Major Subcontractor's final statutory declarations on CCDC form 9B-2001
 - .3 Workers' Compensation and Insurance Board (WSIB) certificate
 - .4 Certificates of approval of the work by the Building Department (if available)
 - .5 Ontario Hydro certificate of inspection.
- .3 Also provide a disk or memory stick containing all construction progress photos submitted; refer to Section 01 32 00. Provide an index with printed images clearly identified with name of project, description of view and date taken. Disks are to be clearly labelled .
- .4 Include the following information, plus any additional data required within the specifications.
 - .1 List of all Subcontractors, major suppliers, and local equipment service representatives, their addresses and telephone numbers.
 - .2 Date of Substantial Performance (commencement of warranty periods) and termination dates of warranties.

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

- .3 Operating manuals including lubricating, repair and other instructions to keep all mechanical and electrical/electronic equipment in good working order. Reviewed shop drawings of same. Refer to Mechanical and Electrical Specifications for further requirements.
- .4 Door and Frame Schedule (as-built); insert in front of Division 08 section in manuals.
- .5 Final hardware schedule, revised to include all changes during construction, including local manufacturer's descriptive and service literature. Include AHC's final inspection report.
- .6 Final finish/colour schedule; insert in front of Division 09 section in manuals.
- .7 Provide paint schedule indicating paint brand and formulas used.
- .8 Maintenance instructions for all types of floor finish and other special finishes. Include instructions for cleaning, repairing, refinishing and freshening, and warnings of damaging or dangerous practices where necessary.
- .9 Maintenance and service instructions and manufacturer's literature for all special architectural features: i.e. windows, patent glazing, handicapped lift etc.
- .10 Description, operations and maintenance instructions for equipment and systems, including complete list of equipment and parts list.
- .11 All warranties, guarantees, bonds, etc., properly completed and signed, which extend beyond the general warranty period, for all work and equipment as specified or as otherwise supplied and installed, from manufacturers and trades. Warranties, guarantees and bonds shall include:
 - .1 Name and address of project.
 - .2 Warranty commencement date.
 - .3 Duration of warranty.
 - .4 Clear indication of what is being warranted and what remedial action will be taken under warranties.
 - .5 Signature and seal of Contractor.
- .5 List additional material used in project showing name of manufacturer and source of supply.
- .6 Neatly type lists and notes. Use clear drawings, diagrams or manufacturer's literature.
- .7 Supply copies of inspection and testing reports, inspection and acceptance certificates, balancing reports, all bound in all three copies of manuals.
- .8 Supply Operations and Maintenance manuals, and other required documentation as specified for Mechanical and Electrical work.
- .9 Manuals must bear seal and signature of Contractor.
- .10 Maintenance Manuals must be delivered, complete and in one package, to Consultant. The final Certificate for payment will not be issued until ALL documentation has been received, reviewed, and approved, by Consultant.

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

1.4 SHOP DRAWING MANUAL

- .1 Provide one complete set of final approved Shop Drawings, bound separately. Shop drawings shall be the drawings reviewed and stamped by the consultants. Mark-up shop drawings to indicate corrections and changes made during fabrication and installation.
- .2 Provide a digital copy of the shop drawing manual, included on the USB flash drive with the digital copy of the maintenance manuals.

1.5 MAINTENANCE MATERIALS

- .1 Where supply of maintenance materials is specified, deliver items as follows:
 - .1 Materials in unbroken cartons or, if not supplied in cartons, they shall be strongly packaged.
 - .2 Clearly mark as to content.
 - .3 If applicable give colour, room number of area where material used.
 - .4 Obtain signed receipt from the Owner's designated representative and store in an assigned, lockable room.
- .2 Copies of signed receipts for maintenance materials are to be included in the maintenance manuals.
- .3 Replacement materials are for the sole use of the Owner and must not be used by Contractor to replace deficient work.

1.6 AS-BUILT DRAWINGS AND RECORD DOCUMENTS

- .1 Provide As-Built Drawings, as specified in Section 01 33 00, and Record Documents (electronic files).
- .2 Prior to the date of Substantial Performance, request updated drawings from the Consultant. Transfer all "as-built" markups from the on-site drawings to these updated drawings and return them to the Consultant for preparation of architectural Record Drawings.
- .3 Record documents shall consist of the original documents altered to reflect all changes and information indicated on as-built documents.
- .4 The Consultant shall prepare architectural Record documents and be reimbursed for costs by the Contractor through the Cash Allowance included in the Contract.
- .5 Refer to Mechanical and Electrical Specification Divisions for specific requirements regarding preparation and submission of final mechanical and electrical Record Drawings.

1.7 REVIEW OF MANUALS BY CONSULTANT

- .1 Submit all manuals for review by the Consultant. Mechanical and electrical manuals may be forwarded directly to the consulting engineers for review.

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

- .2 The Contractor is responsible for confirming the completion of the manuals prior to forwarding to the Consultant for review. If any items are outstanding, provide tabs at the appropriate locations and indicate the nature of the outstanding documents to be inserted.
- .3 Do not submit partially complete manuals to the Consultant; only documents which cannot be provided at the time of Substantial Performance are permitted to be flagged for later insertion. The Consultant will review manuals once for completion and will then review only one resubmission. If additional reviews are required, the Contractor will be invoiced for the Consultant's time at a rate of \$100/hour.

1.8 VALUATION OF CLOSEOUT SUBMITTALS

- .1 Due to the high value to the Owner of the closeout submittals, including maintenance manuals, for the purpose of project administration and calculation of Substantial Performance, the Closeout Submittals will be assigned a value of **\$5,000.00** per discipline (architectural / mechanical / electrical - Total \$15,000.).
- .2 The full assigned value of the submittals will be held in the Contract until such time as all closeout submittals are delivered to the Consultant and are deemed complete and acceptable by the Consultant.
- .3 Architectural record drawings, to be prepared by the Consultant and paid through the Cash Allowance, are not included in the valuation of closeout submittals.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 Maintain existing fire rated separations in building.
 - .1 All ceiling tile to be fire guard type. Provide boxing of fixtures in rated ceilings as typically required for rated floor and roof assemblies.
 - .2 Provide new firestopping at tops of all corridor walls where none is existing. Where existing corridor walls do not extend to the underside of the roof deck, provide rated gypsum board enclosures, filled with mineral wool insulation, between top of wall and underside of deck and firestop perimeter and all penetrations.
 - .3 Provide new firestopping at all new penetrations through corridor walls, and at existing penetrations where no firestopping is existing.
 - .4 Examine existing building to determine the extent of the firestopping work required at existing corridors. For pricing purposes assume that all corridor walls in renovated areas require firestopping along its' entire length. Firestopping shall include 300mm high fire rated gypsum board (both sides of Corridor wall) as well as continuous firestopping both sides.
- .2 Test methods used to determine fire hazard classification and fire endurance rating shall be as required by Ontario Building Code.
- .3 Upon request, furnish the Consultant with evidence of compliance to fire protection requirements as noted in documents or specified codes, etc.
- .4 Materials and components used to construct fire rated assemblies and materials requiring fire hazard classification shall be listed and labelled, or otherwise approved, by fire rating authority. Labelled materials and their packaging shall bear fire rating authorities label showing product classification.
- .5 Fire and time rated door assemblies shall include doors, frame, anchors, and hardware and shall bear label of fire rating authority showing opening classification and rating.
- .6 Construct new fire rated assemblies in accordance with applicable fire test report information issued by fire rating authority. Deviation from fire test report will not be allowed. Where existing conditions do not conform to current tested assemblies, conform to similar assemblies acceptable to Authorities Having Jurisdiction and the Consultant.
- .7 Construct fire rated assemblies as continuous, uninterrupted elements except for permitted openings. Extend fire rated walls and partitions from floor to underside of structural deck above.
- .8 Materials which have a fire hazard classification shall be applied or installed in accordance with fire rating authority's printed instructions.
- .9 Provide firestopping as specified in Section 07 84 00.
 - .1 Firestopping shall be a tested system consisting of non-combustible materials, smoke sealant, and means of support, used to fill gaps between fire-rated separations or between fire separations and other assemblies, and used around items that penetrate a fire separation.

SECTION 01 82 19 - FIRE RATING AND ASSEMBLIES

- .2 Firestopping system shall be tested for the time period required for the fire separation; ie. 1 hour, 2 hours, etc.
- .3 Fill and patch voids and gaps around openings and penetrations in and at perimeter of assemblies so as to maintain continuity and to produce a fire resistant, smoke tight seal, acceptable to jurisdictional authorities.
- .10 Provide fire blocks to compartmentalize concealed spaces as required by the OBC.
 - .1 Fire block means a material, component or system that restricts the spread of fire within a concealed space or from a concealed space to an adjacent space.
 - .2 Fire blocks are also referred to as fire stops in the OBC.
- .11 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 those authorities having jurisdiction. The Contractor shall ensure that the work of Subcontractors is properly coordinated to achieve the intent of this Specification.
- .12 Nothing contained in the Drawings or Specifications shall be construed as to be in conflict with any law, by-law, or regulations of municipal, provincial, or other authorities having jurisdiction. Work shall be performed in conformity with all such laws, by-laws, and regulations.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1	Hazardous Materials	Section 01 35 43
.2	Temporary Barriers and Controls	Section 01 56 00
.3	Execution	Section 01 73 00
.4	Metal Fabrication	Section 05 52 00
.5	Built Up Roofing	Section 07 51 00
.6	Firestopping	Section 07 84 00
.7	Acoustic Ceilings	Section 09 51 00
.8	Terrazzo	Section 09 66 13
.9	Painting	Section 09 92 00
.10	Mechanical	Division 23

1.2 REFERENCES

- .1 Conform to all laws, By-Laws and regulations of the authorities having jurisdiction and, in particular, the Ontario Occupational Health and Safety Act; The Environmental Protection Act; The Ontario Building Code, (Ontario Reg. 332/12); The Ontario Fire Code; The National Building Code, 2010; and the National Fire Code. Refer to current editions of all standards.
- .2 CSA S350-M, code of practice for safety in demolition of structures.
- .3 Environmental Protection Act, R.S.O. 1990, C. E.19, and regulations under the Act, including:
 - .1 O.Reg. 102/94 Waste Audits and Waste Reduction Work Plans
 - .2 O. Reg. 103/94: Industrial, Commercial And Institutional Source Separation Programs
 - .3 R.R.O. 1990, Reg. 347: General - Waste Management
- .4 Occupational Health and Safety Act, and regulations under the Act, including:
 - .1 O.Reg. 213/91 Construction Projects
 - .2 O.Reg. 278/05, Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations amended 479/10.
 - .3 O.Reg. 860/90 Workplace Hazardous Materials Information System (WHMIS)
 - .4 All regulations regarding "Designated Substances"
- .5 Regulations for the transport of asbestos waste, including:
 - .1 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
 - .2 Dangerous Goods Transportation Act, R.S.O. 1990, c. D.1
- .6 Resilient Floor Covering Institute (RFCI)
 - .1 Recommended Work Practices for Removal of Resilient Floor Coverings.
- .7 Conform to "Guidelines for Maintaining Fire Safety During Construction in Existing Buildings", provided by the Office of the Ontario Fire Marshal.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

1.3 EXAMINATION OF EXISTING SITE AND STRUCTURE

- .1 Examine the existing site and building before tendering to be familiar with the detailed extent of demolition, dismantling, relocation and reassembly required.
- .2 Copies of the original working drawings for the construction of the building are available to the Contractor. Refer to Section 00 31 00.
- .3 An inventory of hazardous materials has been conducted for the existing building; a copy of which is included in the Supplementary Information volume. Contractor to coordinate removal of asbestos and other hazardous materials, which is to be performed by one of the firms prequalified by the Owner.
- .4 No allowance will be made for failure to obtain complete information prior to close of tenders.

1.4 SUMMARY OF WORK

- .1 Removal of walls, doors, frames, and ceilings.
- .2 Removal of masonry and new masonry where noted on drawings.
- .3 Removal of roofing and flashings to accommodate new roof work.
- .4 Removal of loose paint and preparation for repainting.
- .5 Removal of steel and precast roof deck and roofing.
- .6 Demolition / removal of parts of mechanical equipment to accommodate new equipment.
- .7 Demolition / removal of built in freezer and repairs to flooring.
- .8 All removed materials shall become property of the Contractor and shall be removed from the site.
- .9 Carry out all alteration and demolition work required to accommodate new work indicated on drawings. Make good any damage caused by alterations required.
- .10 Repair or replace existing damaged surfaces scheduled to be repainted. Finished surfaces to be ready for finish painting.
- .11 Remove HVAC equipment, electrical fixtures and all other items so noted on drawings as required to accommodate new work.
- .12 Unless noted otherwise, building materials resulting from demolition under this contract shall become the property of the Contractor, and shall be removed by the Contractor.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

- .13 Removal of hazardous materials indicated in Supplementary Information (Volume 3). If the Contractor uncovers additional materials within the building which are suspected to be hazardous, they shall inform the Consultant, and the Owner. The Owner will arrange to have materials tested and, if necessary, removed. Removal of any additional hazardous materials is to be performed by forces appointed by the Owner and paid through Change Order.
- .14 Remove, transport, and dispose of hazardous materials in accordance with applicable laws.

1.5 PROTECTION

- .1 Erect interior barriers, notice and warning boards and maintain all protection of all kinds for the protection of the workmen on the Work, for the protection of adjoining property and for protection of public.
- .2 Prevent movement, settlement, and damage to existing building. Provide temporary supports, including shoring and bracing, as required. All shoring must be designed by a professional engineer licenced in the Province of Ontario.
- .3 Protect property against damage which might occur from falling debris or other cause. Make good damage to adjacent public or private properties resulting from Work of this Contract.
- .4 Protect existing building from damage and contamination during demolition activities. All openings must be made weatherproof. Provide temporary barriers, dust control measures, security controls, supports, and such additional protection as may be required by specific demolition work. Cover existing windows, doors, louvres, etc., opening to construction areas with minimum 16mm Type X gypsum board on steel stud framing to prevent exposure to construction activities.
- .5 Employ licensed rodent and vermin exterminators to destroy all discovered vermin and rodents.
- .6 Remove contaminated and dangerous material from the site and dispose of safely and legally. Meet all M.O.E. requirements.
- .7 During demolitions operations, keep work wetted down to prevent dust and dirt from rising. Provide water line for this purpose, furnish connections that may be required. Upon completion, remove installed temporary water lines.
- .8 Take precautions to guard against movement or settlement of adjacent land, existing building, and remaining services and utilities. Provide and place bracing or other means of support.
- .9 Take precaution against contamination of air and adjacent properties.

1.6 MAINTAINING FIRE SAFETY IN EXISTING BUILDING

- .1 Maintain all required exiting for safe operations within the existing building. Where an exit is closed off due to construction activities, provide alternate exit acceptable to both the Consultant and to Authorities Having Jurisdiction. If access to exit must be through an area under construction, provide smoke tight enclosure with minimum 45minute fire resistance rating. Any temporary exits must be clearly identified with appropriate signage.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

- .2 Store all combustible materials in accordance with the Fire Code and the Occupational Health and Safety Act. Do not store combustible materials within the existing building or against the building. All combustibles shall be stored in a manner which minimizes risks to building and occupants.
- .3 Maintain protection at openings, as specified above, with fire separation ratings as required by Authorities Having Jurisdiction.
- .4 Maintain fire alarm system in operating condition in existing building. Notify the fire department and Owner of any temporary shutdowns of service and provide alternative measures during such periods of time.
- .5 Coordinate with Owner and Authorities Having Jurisdiction for all changes to fire emergency procedures as may be required during construction.

1.7 SCHEDULE OF WORK

- .1 Construction enclosures must be installed and construction area secured before any work is undertaken. Enclosure must conform to Ministry of Labour and Municipal requirements as well as these specifications.

1.8 SERVICES

- .1 In building areas to be renovated, seal and cap mechanical and electrical services as required to facilitate removals indicated on drawings. Mark location and type of service of all capped services.
- .2 Include cost to X-Ray concrete floors and walls to determine locations of buried hidden services.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Paintable, elastomeric filler:
 - .1 For filling of holes in masonry.
 - .2 Mor-Flexx by Sashco, in colour to coordinate with substrate.

PART 3 - EXECUTION**3.1 DEMOLITION**

- .1 Refer to drawings for demolition plans and notes.
- .2 Coordinate with asbestos abatement contractor to facilitate asbestos removals and to ensure asbestos is removed where required to permit demolition and alteration Work to proceed.
- .3 Demolish masonry walls in small sections. Do not permit masonry to fall in mass from one level to another.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

- .4 Remove and carefully lower wood or structural steel framing if applicable.
- .5 Remove interior masonry walls, and ceilings, as indicated on drawings, and as required to accommodate new construction.
- .6 Cut terrazzo floors and concrete floor slabs as required to accommodate installation of new frames.
- .7 Remove glass, metals and combustible materials from walls being demolished.
- .8 In areas of building to be altered under the scope of Work of this Contract, remove all partitions and accessories, and all other items not indicated or noted to remain or be re-used.
- .9 Remove mechanical and electrical equipment and piping including propane storage tanks and similar materials. Refer to mechanical and electrical demolition drawings.
- .10 Any items noted to be re-used or re-located are to be removed carefully, cleaned, packaged appropriately, and handed over to Contractor.
- .11 Upon discovery of mould or mouldy materials remove and dispose of these separately.
- .12 If any additional materials suspected to contain asbestos and other designated substances are encountered, do not disturb these materials. Inform the Consultant of the location and extent of suspect material.
 - .1 Do not resume work in this area until it has been cleared by an Abatement Consultant.
 - .2 Coordinate removal of any identified designated substances by trained forces appointed by the Owner; to be paid through the Cash Allowance. Hazardous material abatement is to be completed prior to recommencing demolition work in the area.
- .13 At the end of each day's work, leave work in a safe condition so that no part of the remaining structure is in danger of collapse.
- .14 Do not burn any refuse or debris at the site.

3.2 REPAIRS AND NEW OPENINGS IN EXISTING WALLS

- .1 Where new openings are shown to be cut into existing walls, break open the wall to the sizes required, provide new lintels over the opening and patch all adjacent materials. This includes new openings with lintels for Mechanical trade.
- .2 Repair damage to existing walls in areas scheduled to be repainted, where damage is to substrate, not just the coating. Repairs to deteriorated coatings are specified in Section 09 92 00. Repair masonry surfaces with patching compounds and fillers. Cut out and replace damaged sections of gypsum panels; refer to section 09 29 00 for gypsum board work. All repairs to be completed to level required for finish painting.

3.3 CUTTING OF PRECAST CONCRETE

- .1 Cut precast concrete and remove sections as required to do new mechanical work, and as indicated on drawings.

SECTION 02 40 00 - DEMOLITION AND ALTERATIONS

3.4 REMOVAL OF EXISTING FLOOR AND BASE FINISHES

- .1 Existing floor finishes shall be removed and old adhesive removed from the existing concrete slab by wet scraping, and in accordance with Health & Safety requirements. Use of solvents, or grinding of floor finishes will not be accepted.
- .2 Existing concrete floors shall be prepared according to manufacturer's instructions for new adhesive applied finishes.
- .3 Repair damaged areas of concrete floors by use of patching compounds and fills. Refer to Section 09 01 61 for flooring restoration.
- .4 Protect existing flooring, to remain, from damage.
- .5 Replace terrazzo floor and base in work areas to nearest control joints.

3.5 REMOVAL OF CEILINGS

- .1 Remove existing ceilings and bulkheads in areas where new ceilings and bulkheads are indicated, and as shown on drawings.
- .2 Ceilings to be demolished shall be removed complete with all finishes, framing, suspension system, trim, and accessories.
- .3 Where ceilings are to be removed to accommodate work, and later reinstalled, carefully disassemble ceilings to the extent required. Clean all components, wrap for protection, clearly label package contents, and store in a safe location until they are to be reinstalled.
- .4 Where ceilings are to remain after adjacent walls or bulkheads are demolished, remove ceiling components as required to complete demolition work. Coordinate with forces doing new ceiling work, to confirm what components are to be retained for reuse. Cut ceiling tiles may not be used; new full or appropriately cut tiles will be required.
- .5 Where ceiling mounted equipment is indicated to be removed and reused, or where it must be temporarily removed to accommodate the Work, it is to be carefully removed, cleaned, wrapped, labelled as to contents, and stored in a safe location, ready for reinstallation.
- .6 Repair damaged gypsum board ceilings to remain, in renovated areas, to level ready for finish painting.
- .7 Existing ceilings are fire rated; retain fire rating when repairing and replacing ceilings.

3.6 ROOF OPENINGS

- .1 Remove all roof curbs, abandoned vents and flashings, abandoned gas lines, and all associated supports, sleepers, and accessories, where indicated on drawings.
- .2 Cut openings required for new rooftop units, vents, electrical connections and other rooftop equipment indicated in the documents. Coordinate cutting of new openings to correspond with installation of new work; ensure roof remains watertight at all times.
- .3 Coordinate with roofing trade to ensure that openings in the roof, resulting from demolition work, are made watertight immediately.

- .4 Cover redundant openings in steel deck as follows:
 - .1 Openings up to 300mm in any dimension:
 - .1 Provide minimum 20 gauge galvanized steel plate extending minimum 300mm beyond opening in each direction. Mechanically fasten to roof deck using stainless steel fasteners.
 - .2 Provide wood decking (38mm thick) at wood deck.
 - .2 Openings up to 450mm:
 - .1 Cut back existing roof deck to nearest joists and provide new galvanized steel deck spanning minimum 2 joists, and mechanically fasten using stainless steel fasteners, unless indicated otherwise on structural drawings.
 - .3 Openings over 450mm:
 - .1 Provide 125 x 125 x 6 steel angle framing welded to two OWSJ's.

3.7 MECHANICAL AND ELECTRICAL WORK

- .1 Mechanical and Electrical services must be temporarily capped or terminated to permit renovation in existing areas to proceed.
- .2 Refer to mechanical and electrical drawings for the extent of removals, relocations, and alterations required.
- .3 Ceiling mounted mechanical and electrical equipment which is to be removed and reused is to be carefully removed and stored as specified above.
- .4 Cutting of holes up to 100mm in size in the existing structure and surfaces required by the mechanical and electrical trades shall be by those Subcontractors. Cutting and patching of openings greater than 100mm in size shall be by the Contractor in co-ordination with those trades. PATCHING OF ALL HOLES IN EXPOSED FINISHED SURFACES SHALL BE BY THE CONTRACTOR. Mechanical and Electrical trades shall do their own coring of existing slabs as required.

3.8 COMPLETION OF WORK

- .1 Remove all surplus materials, equipment and rubbish from the site.
- .2 Leave site in condition to meet approval of the Consultant.
- .3 On completion of Demolition work, thoroughly clean all existing surfaces to remain, including ceiling space. No debris or dirt shall remain to be enclosed by new construction.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Supply and installation of new steel lintels over enlarged door openings.
- .2 Supply and installation of galvanized steel supports at roof top condensing unit.

1.2 RELATED WORK

- .1 Structural Steel (see drawings)
- .2 Steel Deck (see drawings)
- .3 Built-Up Bituminous Roofing Section 07 51 00
- .4 Sheet Flashing & Trim Section 07 62 00
- .5 Mechanical Division 23

1.3 REFERENCE STANDARDS

- .1 Conform to CSA-W59, Welded Steel Construction (Metal Arc Welding)
- .2 Use fabricator fully approved by Canadian Welding Bureau, in conformance with the requirements of CSA-W47.1
- .3 Conform to CAN/CSA-S16, Limit States Design of Steel Structures (Consolidation)

1.4 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 01 33 23. Show and describe detail work of this Section.
- .2 Include large scale details of members and materials, connections, joining details, and of anchorage devices, dimensions, gauges, thicknesses, description of materials, metal finishing specifications, as well as all other pertinent data and information.
- .3 Indicate field dimensions on shop drawings.
- .4 Include Engineering calculations substantiating that the design loading of railings and ladders conform to the requirements of the Ontario Building Code.
- .5 Shop drawings for shall be stamped by a professional structural engineer, registered in the Province of Ontario, retained by the Contractor, who shall be responsible for the structural design of metal fabrications.

1.5 FABRICATION

- .1 Design, fabricate and erect structural steel members in accordance with CAN/CSA-S16.1.

SECTION 05 52 00 - METAL FABRICATIONS

1.6 INSPECTION AND TESTING

- .1 The Owner will appoint a Testing and Inspection Company who shall ensure that the deflection and lateral support angles for non-loadbearing masonry walls have been securely anchored to wall and to structure above.
- .2 The cost of this testing and inspection shall be paid through the Cash Allowance included in the Contract; refer to Section 01 10 00.
- .3 Contractor shall cooperate with inspectors and provide full access to all places where the work is being performed.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Structural Steel: to CAN/CSA - S161.1; CAN/CSA-G40.20/G40.21.
- .2 Mild Steel Shapes: CAN/CSA A3-G40.20/G40.21, grade 350W.
- .3 Welding Materials: to CSA W59, CSA W55.3 for stainless steel, ASTM A371; for aluminum, ASTM B 285 and CSA-S244.
- .4 Sheet Steel: wiped coated, ASTM A 446; structural quality Grade A or B, maximum permissible working stress, Grade A 137,895 kPa, Grade B 154,442 kPa.
- .5 Prime Paint: CGSB 1-GP-40 M.
- .6 Bituminous Paint: CGSB-1-GP-108 M.
- .7 Zinc-Rich Coating: organic zinc rich coating, "ZRC 221 Cold Galvanizing Compound" by ZRC Worldwide.
- .8 Steel pipes: to CAN/CSA-G40.20 type 300W; heavy duty, Schedule 40 or better.
- .9 Galvanizing: to CAN/CSA G164, G90.
- .10 Sheet Aluminum: 2mm thick, clear anodized, satin finish.
- .11 Stainless Steel: Type 304 for interior work, Type 317 for exterior applications, No. 4 brushed finish
- .12 Reflective Tape: 3M Diamond Grade Fluorescent Yellow Conspicuity Markings; 50mm wide fluorescent, retroreflective tape for exterior applications.
- .13 EPDM Gasket: Continuous gasket fabricated of 19mm thick, by minimum 19mm wide, 40 durometer EPDM flat cord, as manufactured by Budlar Flexible Products Inc., or approved equivalent.

.14 Bolts and anchors bolts: to ASTM A307-82A.

.1 Supply angles, bolts, anchors, sleeves and any other attachments to structure necessary for the installation of work under this Section.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Execute work according to details and reviewed shop drawings.
- .2 Take all measurements at the building before proceeding with fabrications.
- .3 Report discrepancies in dimensions to the Consultant who shall determine the adjustments to be made.
- .4 Where drawings indicate modifications to existing metal fabrications, the work shall be done by the subcontractor responsible for the work of this Section.

3.2 WORKMANSHIP

- .1 Use only workmen skilled in the Work of this Section. Do work to best standard practice and in accordance with applicable laws, by-laws and regulations. Conform to the requirements of Authorities Having Jurisdiction.
- .2 Fit and assemble work in shop where possible. Execute work according to details and reviewed shop drawings. Where shop fabrication is not possible, make trial assembly in shop.
- .3 Make joints in built-up sections with hairline joints in the least conspicuous locations and manner.
- .4 Welding:
 - .1 to CSA W59.
 - .2 Weld all connections, unless otherwise noted.
 - .3 File or grind exposed welds smooth and flush, so as to be invisible after painting.
- .5 Counter sink screws, unless otherwise noted.
- .6 Make workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work. Fit joints and intersecting members accurately. Make work in true plumb, true, square, straight, level and accurate to sizes and shapes detailed, free from distortion or defects detrimental to appearance or performance.
- .7 Insulate metals where necessary to prevent corrosion due to contact between dissimilar metals and between metals and masonry, concrete or plaster. Use bituminous paint, butyl tape, building paper or other approved means.

SECTION 05 52 00 - METAL FABRICATIONS

- .8 Supply all fastenings, anchors and accessories required for fabrication and erection of the work. Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum and inconspicuous, spacing them evenly and setting them out neatly. Make fastenings of permanent type.
- .9 Draw mechanical joints to hairline tightness and seal countersunk screws and access holes for locking screws with metal filler where these occur on exposed surface.
- .10 Thoroughly clean all ferrous metals, by methods suitable to remove burrs, weld spatter, rust, loose mill scale, oil, grease, dirt and other foreign matter. Apply one coat of prime paint to all surfaces except those requiring field welding. Brush on thoroughly and work well into all crevices.
- .11 After erection and installation, thoroughly clean the work and apply field touch up of same formula as shop coat to all damaged or unpainted surfaces. Work all paint well into all joints, crevices and open spaces.
- .12 Galvanize all exterior work and all steel which will be embedded in concrete or masonry. Partially embedded items shall be galvanized beyond the point of embedment, to protect steel at junction point. Do galvanizing after welding.
- .13 After installation, remove any rust and touch up all galvanized work with two coats zinc rich coating.
- .14 Finish painting is specified in Section 09 92 00.

3.3 SUPPORT STEEL

- .1 Provide and install miscellaneous structural steel supports and any other steel fabrications required for new mechanical openings.
- .2 Provide galvanized steel supports at roof top condensing unit.
- .3 Provide steel supports and angles for new and / or enlarged door openings.
- .4 Provide steel supports at new roof openings.

3.4 MISCELLANEOUS ITEMS

- .1 Examine the drawings and provide all metal brackets and supports detailed or indicated, with the exception of items included in custom cabinetry.
- .2 Anchor Bolts, Lag Screws, etc.: Supply anchor bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeves, brackets, etc. where required or called for on Drawings for work of this Section. Such items occurring on or in exterior wall or slab shall be hot dipped galvanized. Thread dimensions shall be such that nuts and bolts fit without re-threading or chasing threads.

.3 Miscellaneous Sections:

.4

- .1 Provide all miscellaneous steel angles, channels, tubes, plates, etc. of shapes and sized noted or called for in other Sections of the Specifications.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Build-Up Bituminous Roofing Section 07 51 00
- .2 Mechanical Division 23

1.2 REFERENCES

- .1 CAN/CSA O80-Series Standards for Wood Preservation
- .2 CSA O121 Douglas Fir Plywood
- .3 CSA O141 Softwood Lumber
- .4 CSA O151 Canadian Softwood Plywood
- .5 CSA B111 Wire Nails, Spikes and Staples.
- .6 National Lumber Grading Authority (NLGA), Standard Grading Rules for Canadian Lumber

1.3 DELIVERY AND STORAGE

- .1 Do not deliver materials until they are required for incorporation into the work.
- .2 Protect materials, under weatherproof cover, both in transit and on site.
- .3 All exterior and interior finish materials shall, upon delivery, be neatly stored in a dry place and shall be protected from damage due to weather, water, or any other cause.

1.4 PROTECTION

- .1 Protect fire-retardant materials against high humidity and moisture.
- .2 Protect countertops and cabinets with 6 mm plywood or other suitable sheet material.
- .3 Protect installed hardware from damage and blemishes.

PART 2 - MATERIALS

2.1 MATERIALS

- .1 Wood materials: straight, sawn square, true, dressed four sides, properly sized and shaped to correct dimensions from nominal sizes indicated or specified.
- .2 Lumber grade and moisture content:
 - .1 comply with the official grading rules of NLGA for the particular lumber and grade, and structurally complying with the latest requirements of the Ontario Building Code.
 - .2 Comply with CSA Standard O141 Softwood Lumber. Use only grade marked lumber.

SECTION 06 10 00 - ROUGH CARPENTRY

- .3 All wood materials:
 - .1 well seasoned NLGA, free from defects which impair strength and durability.
 - .2 Moisture content limit:
 - .1 S-GRN: Unseasoned
 - .2 S-DRY: Maximum 19% moisture content
 - .3 KD: Maximum 15% moisture content
- .4 Cedar planks: WRCLA No. 2 Export R List 401; No. 2 structural.
- .5 Blocking, cant strips, grounds, nailing strips:
 - .1 NLGA No. 2 Ontario White Pine, No. 2 Red Pine, all complying with the grading rules of the NLGA for Construction,
 - .2 Douglas Fir dense complying with COFI standard grading and dressing rules.
- .6 Douglas Fir plywood:
 - .1 all veneer ply; comply with CSA Standard O121, COFI Exterior.
 - .2 Western softwood plywood - comply with CSA Standard O151, COFI Waterproof glue WSP. Exposed two sides shall be grade G2S, and exposed one side shall be grade G1S.
 - .3 Plywood over steel deck at canopies shall be 19mm thickness, waterproof, tongue and grooved ply.
- .7 Wood preservative
 - .1 Pentox Green preservative and Osmose Cut End preservative, as manufactured by Osmose Pentox Inc.; Pentox Conservator Clear for painted wood.
 - .2 For painted surfaces use clear type and for concealed surfaces use green tinted type.
- .8 Fire Retardant Treatment: To ULC S102; flame spread rating 25 or less.
- .9 Rough hardware:
 - .1 nails, screws, bolts, lag screws anchors, special fastening devices and supports as required for the erection of all carpentry items.
 - .2 For preservative treated wood, use only stainless steel hardware, with the following exception:
 - .1 where galvanized steel items, such as gates, flashings, etc., are being attached to wood, galvanized steel fasteners shall be used.
 - .3 Do not mix stainless steel with galvanized steel; contact of these dissimilar metals can cause galvanic corrosion.
 - .4 Stainless steel hardware to be type 317.
 - .5 Galvanized hardware must be hot-dipped galvanized as follows:
 - .1 fasteners meeting CAN/CSA-G164 minimum zinc coating of 600 g/m² (ASTMA153 Class A or B1 G185)
 - .2 connectors meeting CAN/CSA-G164 minimum zinc coating of 600 g/m² (ASTM A653 Class G-185 sheet) or better.
 - .3 Electroplated galvanized hardware is not permitted.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Examine surfaces to receive the work of this Section and proceed only when conditions are satisfactory for a proper installation.
- .2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.

3.2 INSTALLATION - GENERAL

- .1 Provide running members of the longest lengths obtainable.
- .2 Slowly feed machine-dressed members using sharp cutters. Provide finished members free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding.
- .3 Machine sand surfaces exposed in the finished work and hand sand to an even smooth surface free of scratches.
- .4 Properly frame material with tight joints and rigidly secure in place. Use glue-blocks where necessary.
- .5 Design construction methods for expansion and contraction of the materials.
- .6 Conceal joints and connections wherever possible. Locate prominent joints only where directed.
- .7 Match joints made on the site with joints made in the shop.
- .8 Unless otherwise specified glue and blind screw or nail all work. Set and fill and plug surface screws using matching wood plugs.
- .9 Accurately scribe, cope and mitre members where required to produce hairline joints.
- .10 Erect work plumb, level, square and to the required lines.
- .11 Do not regard blocking, strapping and other rough carpentry indicated as complete or exact. Provide rough carpentry items required for the installation of the Work of other Sections.
- .12 The use of pressure treated wood is required for the following:
 - .1 Wood in direct contact with the ground or framed into concrete below ground level.
 - .2 Structural wood elements within 150mm of ground.
 - .3 In termite areas, for all structural wood elements within 450mm of ground.
 - .4 Wood framing members without a dampproof membrane separating the wood framing member from concrete in contact with the ground.
 - .5 Building components where moisture may accumulate.
 - .6 Retaining walls.

SECTION 06 10 00 - ROUGH CARPENTRY

- .13 Aluminum must not be in direct contact with pressure treated wood. Provide minimum 6mm spacing between aluminum products and treated wood, with 10mil polyethylene barrier and polyethylene or nylon spacers.

3.3 INSTALLATION - ROUGH CARPENTRY

- .1 Blocking and Grounds: Fasten wood nailers, blocking, bucks, grounds curbs, copings and strapping solidly to supporting materials in true planes so that they will remain straight and not be loosened by work of other Trades.

Provide wood blocking and / or plywood for fastening millwork, whiteboards, washroom accessories, corner guards radiation and radiation cover support brackets and other wall mounted equipment.

- .2 Framing: Do all wood framing in accordance with the Ontario Building Code - latest version, and to CAN 3 086 as applicable.

- .3 Wood Surfaces, Cants, Copings, Curbs:

- .1 Fasten wood cant blocking to structure with 19 mm. dia. bolts 760mm o.c.
- .2 Provide wood curbs at new roof penetrations as indicated.
- .3 Wood cants, curbs and copings to be preservative treated. Plywood to be exterior grade.

- .4 Preservative:

- .1 Apply preservative to concealed wood members in contact with exterior walls and roof before fixing in place.
- .2 Apply preservative to all cut ends of pressure treated wood.
- .3 Preserve all other wood indicated to be preserved. Use clear preservative for items to be painted.
- .4 Preserve wood by immersing in preservative for at least one hour.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Remove existing roofing assemblies, down to level of roof deck, in areas where new roofing are being installed and where indicated on drawings.
- .2 Repair roofing affected by demolition work and removal of existing equipment.
- .3 Provide new roof assemblies, to match existing, complete with the following:
 - .1 Vapour retarder
 - .2 Gypsum board
 - .3 Polyisocyanurate insulation
 - .4 Tapered insulation
 - .5 Cover board
 - .6 1 ply organic felt
 - .7 4 ply glass felts
 - .8 Double pour asphalt with ballast
 - .9 All associated sealants
 - .10 Sheet metal flashing, as specified in Section 07 62 00
 - .11 Flashing sleeves
- .4 Asphalting work must be undertaken when the school is vacant. If work is done during the school academic year, asphalting must be done after hours or on weekends. Contract shall include all overtime work required.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|-------------------------------|------------------|
| .1 | Demolition | Section 02 40 00 |
| .2 | Metal Fabrications | Section 05 52 00 |
| .3 | Rough Carpentry | Section 06 10 00 |
| .4 | Sheet Metal Flashing and Trim | Section 07 62 00 |
| .5 | Mechanical | Division 23 |
| .6 | Electrical | Division 26 |

1.3 QUALITY ASSURANCE

- .1 Carry out Work in accordance with recommendations of the Ontario Industrial Roofing Contractors Association (OIRCA) and the Canadian Roofing Contractors Association (CRCA). Use only competent mechanics.
- .2 Install all products in conformance with manufacturer's printed instructions.
- .3 Provide proof of compliance and letter certifying that roofing system complies with Class A roofing system an CAN/ULC S-170.
- .4 Roofing installer must be approved by the manufacturer of the roofing system for the installation and warranty of their products.

1.4 REFERENCE STANDARDS

- .1 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC S126 Test for fire spread under roof deck assemblies.
 - .2 CAN/ULC-S704 Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-51.26 Thermal Insulation, Isocyanurate Board, faced
 - .2 CAN/CGSB-37.5 Cutback Asphalt Plastic Cement
 - .3 CGSB 37-GP-9MA Primer, Asphalt, Unfilled, for Asphalt roofing, Dampproofing and Waterproofing.
 - .4 CGSB 37-GP-15M Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .5 CGSB 37-GP-56M Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA A123.2 Asphalt Coated Roofing Sheets
 - .2 CAN/CSA-A123.21 Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane-roofing Systems
 - .3 CSA A123.3 Asphalt Saturated Organic Roofing Felt
 - .4 CAN/CSA A123.4 Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems
 - .5 CSA A231.1 Precast Concrete Paving Slabs
 - .6 CAN/CSA-A247 Insulating Fibreboard.
 - .7 CSA B35.3 Tapping and Drive Screws.
- .4 Canadian Roofing Contractor's Association (CRCA)
 - .1 CRCA Roofing Specifications Manual.
- .5 FM Approval Standard 4470 Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction
- .6 FM Global Data Sheet 1-29 Roof Deck Securement and Above-Deck Roof Components
- .7 American Society for Testing and Materials (ASTM)
 - .1 ASTM E 108 Standard Test Methods for Fire Tests of Roof Coverings

1.5 ROOFING SYSTEM

- .1 Generally the roofing systems consist of a built-up roof of 4-ply Type IV glass felts and 1-ply organic felts, with modified bitumen flashings, over polyisocyanurate foam insulation all in conformance to CAN/ULC S126. Insulation must conform to S126 without the requirement for a gypsum board membrane.
- .2 Roofing shall be FM approved system, Class A.
- .3 Conform to ULC R210.

1.6 **SUBMITTALS**

- .1 Submit manufacturer's data sheets for roofing system to be installed, including a list of all products to be incorporated. Submit data sheets for all system components. Provide samples when requested by Consultant.
- .2 Submit shop drawings for tapered insulation indicating layout, board thickness, percentage of slopes and direction of flow. List materials used. Do not order materials until drawings have been reviewed and accepted by the Consultant. Submittals to be in accordance with Section 01 33 23 of these specifications.

1.7 **PRODUCT HANDLING**

- .1 Store materials on raised wooden platforms in approved manner at Site preceding application, and protect from inclement weather at all times. Roofing felts which become wet will be rejected.
- .2 Store roofing felts and insulation in heated atmosphere at 21°C for 24hours before application in cold weather. Polywrap roofing felts.
- .3 Guard against condensation inside plastic wrapped insulation by slitting or removing wrap. Cover with tarps and secure with ropes.
- .4 Do not store gravel on roof ahead of demand. Bring gravel to roof only as it is required for spreading as Work proceeds.

1.8 **PROTECTION**

- .1 Protect Work of other trades from roofing procedural damage. Cover vertical surfaces with tarpaulins at hoisting locations.
- .2 When using open flame in connection with this Work, maintain at all times 9 kg dry chemical fire extinguisher fully charged and in operable condition at location where open flames are in use.
- .3 Locate kettles at grade level and minimum 750mm from face of building.
- .4 Protect completed portions of roofing from damage due to traffic and materials handling until completion of Work.

1.9 **ENVIRONMENTAL CONDITIONS**

- .1 Do not apply built-up roofing materials during rain, fog, snow, or other damp or otherwise unsuitable surfaces.

1.10 **WARRANTY**

- .1 Furnish a **five (5) year** "Workmanship, Labour and Material" warranty on the complete roofing system, including all materials and labour against leakage, subsurface moisture, degradation of materials and insulation thermal value, failure to stay in place, undue expansion, deformation, delamination, buckles, blisters, ridges and splitting seams.

- .2 The warranty period shall commence at the date of issue of the Certificate of Substantial Performance.
- .3 Defective work shall include, but not limited to: leaking, wind uplift, delamination of roofing materials, reduction of thermal value due to moisture in insulation, crazing and ridging. Dislodged surfacing and degradation of colour that detracts from its performance or visual appearance will also be judged as defective work and will require correction under the Contract.
- .4 All defective workmanship and material evident during the period of the Warranty must be repaired to restore the work to good condition and to the original intent of the Drawings and Specifications.
- .5 Warranty must cover repairs to other work damaged resulting from defects in the roofing system and from any work to repair said defects.
- .6 Within 24 hours of the Owners notification, repair any leaks into the building or roof assembly.

1.11 INSPECTION AND TESTING

- .1 An independent inspection and testing agency nominated by the Consultant will be appointed to inspect and test roofing and sheet metal work.
- .2 Arrange site meeting with Roofing Inspector and Consultant, maximum two weeks prior to commencement of Work on Site. Obtain Inspector's instructions re procedures to be followed.
- .3 Co-operate with the Inspector and afford all facilities necessary to permit full inspection of the Work and testing of materials prior to their use. Act immediately on instructions given by the inspector. Where the inspector deems a change is required which will involve a change in cost, obtain Consultants written approval BEFORE proceeding.
- .4 Make cut-outs for testing purposes when required and make good roofing at no extra cost to the Owner.
- .5 Pay Inspection and Testing Agency from cash allowance in Section 01 10 00.

PART 2 - MATERIALS

2.1 MANUFACTURERS

- .1 All materials specified are as manufactured by Johns Manville and IKO Industries Ltd. Equivalent products by Firestone Building Products Canada, Tremco, Soprema, or GAF are acceptable, subject to conformance with these specifications. The characteristics of the listed materials, including physical properties and performance statistics, shall be interpreted as forming part of these specifications.
- .2 All materials shall be the products of a single manufacturer, who shall provide the manufacturer's warranty specified above.

2.2 MATERIALS

- .1 Roofing Asphalts:
 - .1 Type 2 and Type 3 oxidized asphalts, conforming to CAN/CSA A.123.4.
 - .2 Provide a label on each container, or certification with each load, indicating flash point (FP), softening point (SP), and equiviscous temperature (EVT).
 - .3 Source of asphalts shall be approved by roofing materials manufacturer.
- .2 Roofing Felts:
 - .1 Glass felts conforming to ASTM D2178
 - .1 Premier type Glasply Type IV by Johns Manville, Type IV Glass by IKO,
 - .2 15lb organic saturated felts to CSA 123.6.
- .3 Asphalt Primer: Conforming to CGSB 37-GP-9A.
- .4 Roof Insulation:
 - .1 Polyisocyanurate insulation with coated glass facers, 1220 x 1220mm boards
 - .1 CAN/ULC S704, Type 2, Class 3; ASTM C 1289, Type II, Class 2, Grade 2 (20 psi)
 - .2 E'NRG'Y 3 CGF by Johns Manville, IKOTerm III rigid polyisocyanurate insulation by IKO,
 - .2 Lay insulation in 2 layers (64mm and 64mm respectively)
- .5 Protection Board: 12mm "RetroPlus" board by Johns Manville, high density perlite based board, conforming to ASTM C728, or 12.5mm asphalt impregnated fibreboard conforming to CAN/CSA A247.
- .6 Tapered insulation:
 - .1 Standard fibreboard tapered insulation over flat fillers of polyisocyanurate insulation.
 - .2 Materials shall be as manufactured by the roofing materials manufacturer, and/or specifically approved by the roofing manufacturer for inclusion in the warranted roof assembly.
 - .3 As supplied by Accu-Plane Enterprise Inc., or Posi-Slope Enterprises;
 - .4 slopes as indicated on drawings (min. 2%).
- .7 Roof Ballast:
 - .1 clean, well graded stone within limits of 9.5mm to 15.9mm, no fines permitted.
- .8 Cant Strips:
 - .1 Wood fibre cants or perlite board cants. Use non-combustible perlite cants where flashings are torch applied.
 - .2 "Fescant Plus" perlite board by Johns Manville.
- .9 Sealant: One part polysulphide base, conforming to CAN/CGSB - 19.13.
- .10 Gypsum Board:
 - .1 DensDeck Fireguard Roof Board by Georgia Pacific, or equal by CGC; 16mm thick.
- .11 Vapour Barrier:
 - .1 DynaGrip Base P/SA, self-adhering membrane, by Johns Manville or IKO MVP self-adhering vapour retardant membrane.

- .12 Primer for Vapour Barrier: As recommended by vapour barrier manufacturer.
- .13 Mechanical Fasteners: FM approved fasteners and stress plates of type recommended by insulation manufacturer for FM approved system.
- .14 Modified Bituminous Roofing and Flashing System:
 - .1 Base sheet:
 - .1 181 g/m², SBS modified bitumen base sheet
 - .2 1 ply of "DynaBase PR" mop grade SBS modified bitumen membrane with polyester reinforcement, by Johns Manville; or 1 ply of "Modiflex MP-180-SS-Base", flexible reinforced polyester mat, sanded top surface, SBS modified bitumen base sheet, by IKO.
 - .2 Cap Sheet:
 - .1 250 g/m², SBS modified bitumen cap sheet
 - .2 1 ply of "DynaLastic Cap 250" modified bitumen membrane, polyester reinforced, white granular surfaced, SBS modified bitumen cap sheet by Johns Manville or 1 ply of "Modiflex Prevent MP-250-Cap" flexible reinforced polyester mat, Frostone Grey ceramic granular surfaced, SBS modified bitumen cap sheet by IKO.
- .15 Conduit Flashing
 - .1 Flexible conduit flashing: Thaler MEF series for single & multiple conduit
 - .2 Rigid conduit flashing: Thaler MEF-AE1-18; 457mm high
- .16 Roof Mastic: As recommended by manufacturer of roofing materials

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Remove existing roofing in areas to be re-roofed; remove roofing only in areas that can be made watertight again in the same day; building must remain watertight at all times.
- .2 Examine conditions of existing deck, parapets, walls, drains, projections and openings, etc., and confirm suitability to receive new work. Advise Consultant immediately if existing deck or other substrates are in need of repair before re-roofing work can commence. Commencement of the work of this section will be taken as acceptance of existing conditions.
- .3 Examine materials over which Work of this Section are applied and ensure that roof deck is free of snow, ice, loose or adhering materials which would impair this Work. Substrate shall be clean, dry and suitable for roofing application.
- .4 Metal deck must be free of rust. Any surface rust must be removed and area coated with zinc-rich paint in conformance with CGSB 1-GP-181M; coat thickness one mil minimum. Do not install roofing over corroded deck; this must be removed and replaced by the Contractor.
- .5 The use of salts, or other ice melting chemicals, on the roof deck is not permitted.

- .6 Ensure that all redundant openings in roof deck have been covered. Refer to Section 02 40 00 for covering of redundant openings in existing roof deck.

3.2 WORKMANSHIP

- .1 Employ experienced and qualified workmen and competent supervision to ensure satisfactory installation in accordance with specified requirements.
- .2 Install roofing materials in accordance with manufacturers printed instructions and these specifications.
- .3 Maintain roofing equipment in good working order.
- .4 Provide a separate kettle for each type of roofing asphalt on site; no mixing of asphalt types will be permitted.
- .5 Apply asphalt generally within 13°C of its equiviscous temperature (EVT). Confirm EVT range of each type of asphalt with supplier.
 - .1 Where roof insulation is applied in asphalt mopping, apply asphalt at 15-20°C lower than the EVT for a heavier mopping, for an minimum application rate of 1.5kg/m².
 - .2 For flood coats for ballast adhesion, apply asphalt at 22-33°C lower than the EVT, for an application rate of 3.7kg/m².
- .6 Do not heat bitumens in excess of their final blowing temperature. Confirm final blowing temperature with supplier. Once asphalt exceeds these temperatures, the material will be considered unsatisfactory and must be removed from the site.
- .7 Construct roof in conformity to Class 1A roof assembly as approved by U.L.C. S126/S127.
- .8 Keep an accurate thermometer suspended in the heating kettle while the work is in progress and provide a similar thermometer to test bitumen temperature at point of application.
- .9 Locate bitumen kettles and tankers to avoid smoke discolouration of existing and adjacent buildings.
- .10 Handle and store materials carefully to prevent damage. Keep manufacturer's labels and seals intact. Store bitumen containers in an upright position and store roofing rolls on end to prevent flattening. Protect materials from moisture at all times. When temperature is below 5°C., store roofing felts in a warm atmosphere for 48 hours before using.
- .11 Do not apply roofing materials during inclement weather.
- .12 All plies of roofing felt, except when otherwise specified, shall be "mopped solid" and squeezed into bitumen. Apply felts in straight lines, free from air pockets, wrinkles, fishmouths, open laps or tears.
- .13 Do not leave installed insulation or roofing felts unprotected. Provide minimum 2-ply organic felts, fully coated with bitumen, and ensure that edges are sealed against penetration of moisture.

- .14 Where roofing elements are torch applied, confirm that no combustible items have been ignited. Carefully inspect roof areas with an infrared scanner for at least one hour after completion of days work and before trade leaves site, to ensure that there is no combustion.

3.3 CANT INSTALLATION

- .1 Provide fibre cants at junction of roof and all vertical surfaces and other locations where wood cants are not provided. Cants are to be installed after vapour barrier, as noted below.
- .2 Apply a continuous and uniform mopping of Type 3 asphalt to sufficiently cover the area being taken up by the cant, and while the asphalt is hot embed the cant strips into the asphalt.
- .3 Cut and fit around corners, angles, etc., mitre joints and seal with asphalt.
- .4 Where roof abuts steel framed metal panelled walls, roofer shall install 18 ga. galv. upstands, as detailed, to extend roof installation up wall, installation, and install mod. bid flashing as specified below.

3.4 ROOFING - APPLICATION

- .1 Tie all new roofing into existing systems. Cut back existing roofing components as required to achieve successful tie in. Final flood coating and ballast shall be feathered out over adjacent, existing, roof areas.
- .2 Vapour Barrier
 - .1 Provide continuous vapour barrier over areas to receive new roofing, including over parapets, and tie into existing roof vapour barrier and into vapour barriers at walls, windows, metal roofing, and other surfaces.
 - .2 Apply vapour barrier over surface of roof deck, prior to installation of wood nailers, blocking and cants. Extend up vertical face behind blockings and cants to top of cant. Provide vapour barrier under all cants and blocking and extend up and over parapets to join to wall vapour barrier, lapping all joints minimum 200mm.
 - .3 Vapour barrier shall be self-adhering membrane as specified above. Prime all surfaces to receive self-adhering vapour barrier in accordance with manufacturer's printed instructions.
 - .4 Provide additional vapour barrier under all cants and blocking and extend up vertical face behind blockings and cants to top of cant. Lap minimum 200mm onto first layer of vapour barrier.
 - .5 Apply self-adhering vapour barrier to primed surfaces in accordance with manufacturer's printed instructions, lapping all joints a minimum of 150mm.
- .3 Thermal Insulation
 - .1 Keep insulation dry at all times. Insulation showing evidence of having been dampened since its manufacture or separation of laminations shall not be used.

SECTION 07 51 00 - BUILT-UP BITUMINOUS ROOFING SYSTEM

- .2 Lay only as much insulation in one day as can be covered by felts the same day.
 - .3 Installed roof insulation which has become wet shall be removed and replaced with dry insulation.
 - .4 Lay insulation boards in parallel courses. Stagger end joints in alternative courses. Lay boards to moderate contact without forcing joints. Cut boards to fit neatly around projections through roof.
 - .5 Lay insulation in two layers, as follows:
 - .1 Over roof deck, fasten insulation base course with mechanical fasteners, with min. 5 plates per 1220 x 1220mm section. Secure insulation board within 1200mm of the roof perimeter over metal deck with 50% additional mechanical fasteners. Provide 75% additional fasteners within 1200mm of corners.
 - .2 Stagger joints in second layer half board width or length and embed second layer in full mopping of Type 3 asphalt.
 - .6 Reduce thickness of insulation at roof drains by 25mm to prevent puddling.
 - .7 Provide tapered insulation at locations noted on drawings.
 - .8 Install protection board over insulation in a full mopping of type 3 asphalt. Butt joints tightly together.
- .4 Roofing Felts
- .1 Prior to commencing installation of roofing felts, ensure that the substrate is dry. Any moisture present in the top layer of the protection board will result in blistering and a potential delamination of the membrane from the substrate .
 - .2 Built up roofing membrane shall consist of one layer of 15lb organic felt and 4 plies of type IV glass ply felts.
 - .3 Installation shall start at lowest point of roof. Install membrane one ply at a time, parallel to flutes in metal deck.
 - .4 Over protection board, provide a single ply of #15 organic felt in a full mopping of asphalt, overlapping edges minimum 150mm.
 - .5 Over organic felt layer, install 4 plies of type IV glass ply felts, each ply lapped $\frac{3}{4}$ width of sheet plus 15 mm over the preceding sheet. Lap end joints minimum 150mm. Terminate all plies at the top of the cant strips, unless otherwise specified or detailed. Provide additional plies where detailed.
 - .6 Apply Type 2 hot asphalt uniformly and continuously at the rate of 1.2 kg/m² of roof area over the protection board and each layer of membrane.

.5 Graveling

- .1 Aggregate must be clean and dry before embedding into asphalt. In cold weather, heat aggregate as recommended by roofing manufacturer and roof inspector.
- .2 Apply flood coating of Type 2 asphalt at rate of 3.7 kg/m² and embed aggregate at rate of 20 kg/m².
- .3 A double pour of asphalt and gravel is required. After first pour, broom off all loose stone and apply additional 3 kg/m² asphalt and embed specified aggregate at rate of 20 kg/m².
- .4 Terminate aggregate at base of cant strips.

3.5 TWO PLY MODIFIED BITUMINOUS FLASHINGS

- .1 Apply modified bituminous flashings in accordance with membrane manufacturer's requirements and CRCA requirements for a 2 ply modified bituminous flashing system.
- .2 Apply modified bituminous base sheet with hot type 3 asphalt, with side laps of 75mm and end laps 150mm. Terminate base sheet at highest possible points and at parapets extend and mop-in over top ply roof felt.
- .3 Cap sheet flashing shall be mopped on.
- .4 To prevent possible voids at end/side laps at base or cap sheets, cut the corner piece off the selvage edge that will be covered by the next roll. The cut piece shall be the width of the lap (75mm) and extended along the selvage edge 150mm.
- .5 Stagger locations of all end laps on roof area minimum 75mm.
- .6 Cap sheet flashing shall be applied to extend down outside face of parapet, across top of parapet, down interior vertical surface and on to flat roof a distance of 150mm.
- .7 Cap sheet shall be mopped on in accordance with recommendations of the membrane Manufacturer.
- .8 Care must be taken to avoid asphalt seepage greater than 6mm. At seams, ensure that membrane is properly bonded, without air pockets, wrinkles, fishmouths or tears.
- .9 Cap sheet shall have side laps of 75mm and end laps 150mm. Surface granules on end laps shall be embedded prior to installation of following sheet.
- .10 After installation of the cap sheet, check all lap seams. Adhere and reseal all seams found to be poorly mopped and bonded.
- .11 Face nail total flashing system to outside face of parapet wood blocking with galvanized roofing nails.

- .12 At low roof/exterior wall interface where wall flashings extend down over mod bit flashings, lightly trowel a continuous 75mm width of cap sheet and lap and bond wall flashing onto mod bit flashing. Refer to details as shown on Drawings.
- .13 Strip-in flanges of roof accessories, 'stack jacks' and other flashing flanges with a single ply of base sheet embedded in continuous mopping of asphalt of the same type used for the roof membrane. Set flanges into a bed of plastic cement. Similarly, gravelstop flanges must be primed and secured at 300mm o.c.

3.6 ROOF PENETRATION FLASHINGS AND ACCESSORIES

- .1 Supply and install stack jacks and flashings at cables, conduits and anchors, at all vents, pipes and roof penetrations to make watertight.
- .2 Horizontal metal flanges shall be back painted on both sides. Set deck flange in a layer of plastic cement and strip in the metal flange with 3 plies of roofing felt each thoroughly embedded into hot bitumen. The first ply of roofing felt extending 900mm from the base of the flange onto the roof, the second ply extending 660mm from the base and the third ply extending 900mm from the base onto the roof. Extend the top pour of bitumen to finish tight and flush against the base of the flange.
- .3 If using limestone ballast, apply an asphaltic or other type protective coating to aluminum stack jack flashings to a height of 50 mm above the ballast to avoid a corrosive reaction.
- .4 Install roofing accessories in accordance with manufacturer's printed instructions and as indicated on Drawings.

3.7 CLEANING

- .1 Prior to occupancy of building, clean roof of all debris.
- .2 Stone must be clean and white to maximize solar reflectance properties. Clean or replace any ballast stone that has been discoloured.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|-----------------------------|------------------|
| .1 | Built-Up Bituminous Roofing | Section 07 51 00 |
| .2 | Joint Sealants | Section 07 92 00 |
| .3 | Mechanical | Division 23 |

1.2 REFERENCES

- | | | |
|----|---|--|
| .1 | ASTM International | |
| .1 | ASTM A653M | Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| .2 | ASTM A924M | Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process |
| .3 | ASTM D41 | Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing |
| .4 | ASTM D2092 | Standard Guide for Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting |
| .2 | Canadian Sheet Steel Building Institute (CSSBI) | |
| .1 | CSSBI S8 | Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products (Canadian Sheet Steel Building Institute) |
| .2 | CSSBI 20M | Standard for Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications |
| .3 | CSSBI SSF No. 6 | Metallic Coated Sheet Steel Products for Structural Building Products |
| .3 | Sheet Metal & Air Conditioning Contractors's National Association | |
| .1 | SMACNA Architectural Sheet Metal Manual, 7 th Edition | |

1.3 QUALITY ASSURANCE

- .1 Work of this Section shall be executed by same trade specialists installing membrane roofing, in accordance with practices and details of Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual.

1.4 SUBMITTALS

- .1 Submit typical 300 mm long sample of flashing indicating design method of locking and method of anchoring and corner section fabricated from materials specified.

1.5 WARRANTY

- .1 Contractor hereby Warrants that Work performed under this Section shall remain free against leakage, joint spalling and similar defects in accordance with General Conditions, but for a period of **five (5) years**.

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

1.6 INSPECTION AND TESTING

- .1 Inspection and testing of this Work is included in inspection and testing of roofing and roof insulation.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Metal Flashing: Minimum 26ga prefinished sheet metal steel supplied in flat sheet stock. Colour to match existing.
- .2 Nails: Chromium/Nickel, No.12 x 25mm flat headed, annular threaded stainless steel.
- .3 Cleats, Starter Strips and Back-up Plates:
 - .1 Same metal and thickness as metal flashing;
 - .2 cleats minimum 38mm wide and interlocked with metal flashing; starter strips, continuous.
 - .3 Back-up plates minimum 300mm wide where adjacent lengths of cap flashing meet, fabricated of same material thickness and finish as cap flashing.
- .4 Screws, Bolts and Expansion Shields:
 - .1 Non-ferrous metal compatible with adjacent surfaces.
 - .2 Exposed fastenings shall be same materials as metal surfaces through which they penetrate.
 - .3 Use cadmium plated screws with round heads suitable for soldering for galvanized Work.
- .5 Solder: ASTM B32-70, 50% block tin and 50% pig lead.
- .6 Flux: Commercial hydrochloric acid cut with zinc, or 10%-20% solution of orthophosphoric acid in water, for use with galvanized Work.
- .7 Sealants: As specified in Section 07 92 00.
- .8 Asphaltic Primer: CGSB 37-GP-9M and ASTM D41; Henry/Bakor "Primer 910-01", quick drying asphaltic base paint.

PART 3 - EXECUTION**3.1 FABRICATION**

- .1 Where possible, shop fabricate flashing components in accordance with applicable requirements of SMACNA Architectural Sheet Metal Manual.
- .2 Carry out fabrication in clean shops, located away from areas where carbon steel is torch cut, ground, or cut with abrasive wheels to ensure that carbon steel dust will not be embedded in prefinished surfaces. Clean tools and dies which have been used on carbon steel prior to fabrication to prevent contamination of surface with carbon steel dust.

- .3 Form sheet metal on bending brake. Perform shaping, trimming and hand seaming on bench, where practicable, using proper sheet metal working tools.
- .4 Form sections square, true and accurate to size. Flashings shall be free from distortion, waves, twists, buckles or other defects detrimental to appearance and performance.
- .5 Make allowances for thermal movement when forming, installing, interlocking and soldering sheet metal Work to avoid buckling, fullness of metal straining of joints or seams.
- .6 Fabricate flashings, copings, closures, plastic boxes, pipe sleeves and flashings for roof mounted equipment to details shown, unless otherwise indicated.
- .7 Wipe and wash clean, soldered joints immediately after joint is soldered to remove acid.
- .8 Where soldered joints are absolutely necessary and where approved for use in prepainted metal, clean paint off both surfaces before soldering for minimum area necessary.

3.2 **INSTALLATION**

- .1 Carry out Work in accordance with industry standard sheet metal practice with joints lapped, locked, cleated with "S" cleats and caulked or soldered as required. Hem exposed edges 12mm. Type of joints used shall be adequate for various conditions, subject to approval.
- .2 Fabricate exposed fastening, where used, in such a manner as to prevent water penetration at point of fastening.
- .3 Provide starter strips where indicated or required to present true, non-waving, leading edge. Anchor to back-up to provide rigid, secure installation.
- .4 Make end joints where adjacent lengths of metal flashing meet using 300mm. long back-up flashing secured in place before installing flashing. Apply beads of caulking compound on face of back-up plate to seal ends of metal flashing. Leave 12mm wide space between end of adjacent lengths of metal flashings. Fabricate back-up of same material and finish as metal flashing with which it is being used. Make back-up plate exact profile of flashing allowing for thickness of flashing joints.
- .5 Form metal fascia with inner edge extended over fascia top and down cant to meet roofing aggregate. Nail with roofing nails and neoprene washers at 300mm C. Avoid placing nails in face of fascia, through membrane or flashing.
- .6 Interlock counter flashing pieces with prepainted metal base flashing and fold locking seam into position ensuring complete sealing. Continue counter flashing down to hemmed and sprung position at base of cant and junction of aggregate.
- .7 Provide underlay of resin sized paper under sheet metal installed over masonry, concrete or wood. Lay underlay dry as sheet metal Work is installed. Secure in place and lap joints 100mm.
- .8 Imperfections in sheet metal Work such as holes, dents, creases, or oil-canning is cause for rejection.

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

- .9 Repair damaged sheet metal Work, wash entire installation down, and leave in neat condition.
- .10 Provide all flashings required for proper execution and completion of the Work in acceptable manner including metal flashing around mechanical and other equipment occurring on roof.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 Maintaining of existing fire rated separations in building.
 - .1 This includes firestopping of penetrations through existing rated partitions and assemblies, where none exists.
 - .2 All floor and roof assemblies shall be considered to have a one hour fire resistance rating.
 - .3 All corridor and stair walls are fire rated and require new firestopping.
 - .4 Refer to Section 01 82 19 for extent of new firestopping in existing corridors.
- .2 Firestopping of Penetrations in Rated Assemblies.
- .3 Fire Resistive Joint Systems.
- .4 Perimeter Fire Containment Systems.
- .5 Firestopping of Penetrations in Fire Blocking Compartments.
- .6 Smoke Seals
- .7 Provide all labour, materials, products, equipment and services, to supply and install the firestopping and smoke seal work for the entire project, including at the following locations:
 - .1 Openings in new and existing fire rated walls, floors and roofs both empty and those containing penetrations.
 - .2 Openings in new gypsum board enclosures at top of existing corridor walls.
 - .3 Gaps located within expansion joints.
 - .4 Openings in fire rated shafts.
 - .5 Gaps between the tops of new and existing fire rated walls and the underside of the roof deck, whether or not the ceiling is part of a "rated assembly". Note that the existing building assemblies do not conform to current standards.
 - .6 Gaps between the tops of new and existing fire rated walls and underside of fire rated floor or roof assemblies.
 - .7 Penetrations through construction enclosing compartmentalized concealed areas (fire blocks), involving both empty openings and openings containing penetrating items.
 - .8 Penetrations through smoke barriers, including 0-hour rated fire separations.
- .8 Note: It is not the intention of this section to delete firestopping work fully specified in the mechanical and electrical specifications. Coordinate with all mechanical and electrical sections to ensure the complete firestopping of the entire building. All firestopping not specifically called for in the mechanical and electrical specifications is to be included under this section.
- .9 For the purpose of pricing firestopping work at existing walls, assume that all corridor walls have compromised fire separations above ceiling.
- .10 Include for supply and installation of two layers of continuous 300mm high fire rated gypsum board, Roxul insulation firestopping and continuous fire caulking on both sides of all stair and corridor walls on second floor.

SECTION 07 84 00 - FIRESTOPPING AND SMOKE SEAL

1.2 RELATED WORK

- .1 Fire blocking of concealed spaces:
 - .1 Fire separation of concealed spaces shall be provided under applicable specification sections, and as indicated on drawings.
- .2 Non-Rated Openings through Floors and Walls:
 - .1 Non-rated openings through floors and walls shall be sealed under applicable architectural, mechanical, and electrical specification sections.
- .3 Metal sleeves for fire rated openings through floors and walls shall be provided under applicable mechanical and electrical specification sections.
- .4 Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies shall be sealed under applicable mechanical and electrical specifications sections and only in accordance with the equipment or device manufacturers' installation instructions.

1.3 RELATED SECTIONS

- | | | |
|----|----------------------------|-------------------|
| .1 | Fire Rating and Assemblies | Section 01 82 19 |
| .2 | Applied Fireproofing | Section 07 81 00 |
| .3 | Joint Sealants | Section 07 92 00 |
| .4 | Mechanical | Divisions 23 |
| .5 | Electrical | Divisions 26 - 28 |

1.4 REFERENCE STANDARDS/DOCUMENTS

- .1 Underwriters Laboratories of Canada (ULC):
 - .1 ULC List of Equipment and Materials, Firestop Systems and Components
 - .2 CAN/ULC-S101 Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .3 CAN/ULC-S115 Standard Method of Fire Tests of Firestop Systems
- .2 Underwriters Laboratories, Inc. (UL):
 - .1 UL Fire Resistance Directory
 - .1 Firestop Devices Certified for Canada
 - .2 ANSI/UL 263 Fire Resistance Ratings
 - .3 UL 2079 Tests for Fire Resistance of Building Joint Systems
 - .4 UL 1479 Fire Tests Of Through-Penetration Firestops
- .3 Intertek WH Mark Product Directory
- .4 American Society for Testing and Materials (ASTM):
 - .1 ASTM E1966 Standard Test Method for Fire-Resistive Joint Systems
 - .2 ASTM E814 Test Method of Fire Tests of Penetration Firestop Systems
 - .3 ASTM E 2174 Standard Practice for On-Site Inspection of Installed Firestops
 - .4 ASTM E 2393 Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers
- .5 Factory Mutual Approval Guide

1.5 **PERFORMANCE REQUIREMENTS**

- .1 Provide firestopping systems of sufficient thickness, width and density to provide and maintain a fire resistance rating, as indicated on drawings and in accordance with ULC, cUL or WH design numbers.
- .2 Provide a seal completely filling all annular spaces to prevent the passage of flame, smoke and gases through the opening in the fire separation in which it is installed.
- .3 Provide materials which are compatible with all materials used in the system including materials used in or on penetrating items as well as all construction materials used in conjunction or contiguous with the system.
- .4 Accessories:
 - .1 Provide components for each firestopping system that are needed to install fill materials.
 - .2 Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems.
 - .3 Accessories include but are not limited to the following items:
 - .1 Permanent forming/damming/backing materials
 - .2 temporary forming materials
 - .3 substrate primers
 - .4 collars
 - .5 steel sleeves
- .5 Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
- .6 Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
- .7 Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
- .8 Openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
- .9 Penetrations through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to the fire outside of the chase wall.
- .10 Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
- .11 Provide through penetration firestop systems and fire-resistive joint systems subjected to an air leakage test conducted in accordance with Standards UL1479 and UL2079, with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the through penetration firestop system or fire-resistive joint system to restrict the movement of smoke.

SECTION 07 84 00 - FIRESTOPPING AND SMOKE SEAL

- .12 Testing agency shall be accredited by Standards Council of Canada and approved to perform fire endurance testing as outlined in this section of Work, which includes the following agencies;
 - .1 Underwriters Laboratories (Canada). ULC mark.
 - .2 Underwriters Laboratories, approved for Canada; cUL mark.
 - .3 Intertek Testing Service NA Ltd. (formerly Warnock Hersey); WH mark

1.6 SUBMITTALS

- .1 Manufacturer's Data:
 - .1 Provide submittals in accordance with Section 01 33 23.
 - .2 Submit all ULC, cUL, or WH tested systems or designs proposed for use on the project. Submissions must be in compliance with the requirements of the Contract Documents and certified for use in Canada.
 - .3 Submit manufacturer's specifications, installation instructions and product data for each material to be used. Materials must be as listed on the submitted tested system documents.
 - .4 Submit MSDS for all materials.
- .2 Shop Drawings: Submit shop drawings showing typical installation details, including reinforcement, anchorage, fastenings and method of installation for each type of firestopping condition.
- .3 Samples: If requested, submit samples of each type of firestopping systems, smoke seals and accessories. Indicate location where material/system shall be utilized.
- .4 Qualifications: Submit certificate indicating qualifications of installer.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Manufacturer shall be one of the approved manufacturers listed below.
- .2 Applicator: Company having a minimum of three (3) years experience in the installation of materials specified herein, on projects comparable to this project, who is certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products in accordance with the specified requirements.

1.8 REGULATORY REQUIREMENTS

- .1 Conform to the Ontario Building Code for fire resistance ratings.
- .2 Provide materials, accessories and application procedures which have been listed by ULC, cUL, or tested by a nationally recognized independent testing agency in accordance with ASTM E814, UL 1479, and CAN/ULC-S115 to achieve the required fire protection ratings.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Do not proceed with the installation of firestopping materials when temperatures or weather conditions exceed the manufacturer's recommended limitations for installation.

- .2 Ventilate solvent based and moisture-cure firestopping per firestopping manufacturer's instructions by natural means or, where this is inadequate, by forced air circulation.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to Site in manufacturer's sealed, undamaged containers, with labels intact. Labels shall identify product and manufacturer, date of manufacture; lot number; shelf life, qualified testing and inspection agency's classification marking, and mixing instructions for multi-component materials.
- .2 Handle and store materials in accordance with manufacturer's instructions.

1.11 PROJECT/SITE CONDITIONS

- .1 Comply with manufacturer's recommended requirements for temperature, relative humidity and substrate moisture content during application and curing of materials.
- .2 Maintain minimum temperature before, during, and for minimum 3 days after installation of materials.
- .3 Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.

1.12 SEQUENCING AND SCHEDULING

- .1 Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- .2 Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- .3 Do not install firestopping system until Work within opening has been completed. Coordinate with other applicable Sections.
- .4 Schedule installation of safing materials in linear opening at curtain wall prior to construction that limits access to safing slot.
- .5 Schedule work of other trades so that firestopping applications can be inspected prior to being covered by subsequent construction.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- .1 Provide firestopping silicone sealants, water-based sealants, intumescent sealant, mortars, or firestop devices from one of the following manufacturers:
 - .1 A/D Fire Protection Systems Inc.
 - .2 Tremco Fire Protection Systems Group
 - .3 Hilti (Canada) Corporation
 - .4 Nuco Inc., Self-Seal Firestops

SECTION 07 84 00 - FIRESTOPPING AND SMOKE SEAL

2.2 MATERIALS

- .1 Firestop systems:
 - .1 Provide a complete system of asbestos-free firestop systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115, ASTM E814, and UL 1479 or UL 2079, and listed by ULC, cUL, or Intertek (WH), and approved by jurisdictional authorities and the Consultant.
 - .2 Comply with Ontario Building Code requirements for locations and ratings.
- .2 Materials specified below are as manufactured by A/D Fire Protection Systems Inc. Equivalent products manufactured by one of the approved manufacturers listed above are acceptable.
- .3 Silicone Sealants:
 - .1 Primerless, single component silicone sealant, curing to durable, flexible, silicone rubber; to ASTM C 920, Type S, Grade NS, class 25; A/D Firebarrier Silicone Sealant or equivalent.
 - .2 For use in: openings with penetrating items subject to high movement; multiple penetration systems; for combustible pipes up to 2-in. diameter; in control joints; in curtain wall joints; expansion joints; floor/wall joints; wall/wall joints; head of wall joints; and as a sealant for smoke barrier construction.
- .4 Pourable Sealant:
 - .1 Single component, water based, elastomeric sealants, forming durable, flexible, watertight bonds; A/D Firebarrier Seal (pourable) and Seal NS (non-slumping) or equivalent.
 - .2 Use non-slumping type for vertical applications.
 - .3 Water based firestop sealants for use with: control joints; head of wall joints; floor/wall joints; wall/wall joints; multiple penetration systems; plumbing; mechanical; electrical; and where sprayed sealant application is required or desired.
- .5 Intumescent Caulk:
 - .1 Single component, water based, elastomeric sealant for use in interior building locations; A/D Firebarrier Intumescent Caulk or equivalent.
 - .2 For general use as a firestop sealant with: insulated pipes; pipes; electrical cables and conduit; ducts.
- .6 Mortar:
 - .1 Non-combustible, fibre reinforced, foamed cement mortar; A/D Firebarrier Mortar or equivalent.
 - .2 For use in: large openings; static non-moving penetrations such as cable trays; for multiple penetration systems; electrical and communication bundles; conduits; non-combustible sleeves; and insulated pipes.
- .7 Collars:
 - .1 Steel collars with intumescent silicone strip, in diameters to suit pipe sizes; A/D Firebarrier Collar or equivalent.
 - .2 For use in openings with single combustible pipe penetrations greater than 50mm diameter; confirm maximum pipe diameter (for applicable tested assemblies) with manufacturer.

- .8 Pillows:
 - .1 Self-supporting, sealed polyethylene bags containing intumescent materials and non-combustible insulation; A/D Firebarrier Pillows or equivalent.
 - .2 For use in openings with: cable tray; multiple cable penetrations; where retrofitting of penetrating items is anticipated; and as a temporary firestop system.
- .9 Mineral Wool:
 - .1 Non-combustible, semi-rigid, preformed mineral wool strips and sheets; A/D Firebarrier Mineral Wool or equivalent.
 - .2 For use in tested firestop systems, as fire barrier and forming material.
- .10 Additional Materials:
 - .1 All materials shall be by the manufacturer's listed above and shall be components of tested assemblies, acceptable to local authorities having jurisdiction, for the fire rating required.

2.3 ACCESSORIES

- .1 Damming and backup materials, supports and anchoring devices: Non-combustible, to manufacturer's recommendations and in accordance with the tested system being installed, and as acceptable to local authorities having jurisdiction.
- .2 Primers: As required by firestopping manufacturer and compatible with selected system and contiguous materials.
- .3 Water: Potable.
- .4 Tape: Pressure sensitive masking tape as recommended by the firestopping manufacturer.
- .5 Fasteners: Provide suitable fasteners, for applicable substrates, for all collars and other field fastened firestopping components.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine substrates, openings, voids, adjoining construction and conditions under which the Work is to be installed. Confirm compatibility of surfaces scheduled to receive firestopping.
- .2 Verify that penetrating elements are securely fixed and properly located with the proper space allowance between penetrations and surfaces of openings.
- .3 Do not proceed with Work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Surfaces to receive firestopping shall be free of dirt, dust, grease, oil, rust, loose materials, form release agents, frost, moisture or any other matter which would impair the bond of firestopping material to the substrate of penetrating item(s).

SECTION 07 84 00 - FIRESTOPPING AND SMOKE SEAL

- .2 Prime substrates in accordance with manufacturer's written instructions or recommendations. Confine primers to areas of bond; do not allow spillage or migration onto exposed surfaces.
- .3 Do not apply firestopping and smoke seals to surfaces previously painted or treated with sealers, curing compounds, water repellent or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure that anchoring devices, back-up materials, clips, sleeves, supports and other related materials used in the actual fire tests are provided.
- .5 Mask where necessary to prevent firestopping materials from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing firestopping seal with substrates.
- .6 Installation is not to proceed until submittals have been reviewed and returned by the Consultant.

3.3 INSTALLATION

- .1 Manufacturer's Instructions:
 - .1 Comply with ULC, cUL, or WH listings and manufacturer's instructions for the type of material and condition of opening in each case.
 - .2 Consult with the manufacturer's technical representative to determine proper procedure for conditions not fully covered by printed instructions.
 - .3 Record in writing any oral instructions received, with copy to manufacturer.
- .2 Firestopping for vertical applications:
 - .1 Non-sag caulk or spray grade sealants, Mortar, Collars or Pillows.
 - .2 Mineral wool fire resistant filler, per tested design.
 - .3 Install sealants on both sides of walls and other vertical elements.
- .3 Firestopping for horizontal applications:
 - .1 Non-sag caulk or self-levelling or spray grade sealants, Mortar, Collars or Pillows.
 - .2 Mineral wool fire resistant filler, per tested design.
- .4 Firestopping for overhead applications:
 - .1 Non-sag caulk or spray grade sealants or Mortar.
- .5 Install firestopping with sufficient pressure to properly fill and seal openings to ensure an effective smoke seal. Tool or trowel exposed surfaces. Remove excess firestopping material promptly as the Work progresses and upon completion.
- .6 Damming: Provide leak-proof dams as required to seal openings and contain liquid sealants, putty or mortar until cured. Install damming in accordance with manufacturer's instructions.

- .7 Damming Boards: Install forming/damming materials and other accessories of type required to support fill materials during their application and in the position needed to produce the shapes and depths required to achieve fire ratings of through-penetration firestop systems.
 - .1 Combustible Type: For temporary dams only. Remove after firestopping material has cured.
 - .2 Non-Combustible Type: For temporary or permanent dams. Provide non-combustible type wherever damming material cannot be removed after applying firestopping materials.
- .8 Void Filler: Use materials recommended by the firestopping manufacturer to seal gaps created by non-combustible type damming boards and to seal around cables, conduits, pipes and where void filler material becomes part of the fire rated assembly.
- .9 Sealant:
 - .1 Install damming material or mineral wool as required.
 - .2 Apply sealant so air voids are not present and sealant is in full contact with penetrating items. Tool sealant to ensure substrate contact.
 - .3 Remove excess sealant in accordance with manufacturer's recommendations.
- .10 Mortar:
 - .1 Install damming material as required.
 - .2 Mix mortar in strict accordance with manufacturers instructions.
 - .3 Pump, trowel or hand pack mortar through openings to minimum thickness as recommended by manufacturer and as listed by ULC, or cUL, to achieve required fire rating.
- .11 Firestopping Mineral Wool:
 - .1 Install firestopping by compressing material to the minimum required by ULC, cUL, or WH listing.
 - .2 Apply firestopping in sufficient thickness, depth and density so as to achieve the required fire resistance rating.
 - .3 Use impaling clips to support and secure firestopping where required by tested system.
 - .4 Provide mineral wool additionally to provide acoustic separation between spaces.
- .12 Where joint application is exposed to the elements, fire-resistive joint sealant must be approved by manufacturer for use in exterior applications.

3.4 FIELD QUALITY CONTROL

- .1 Notify Consultant when completed installations are ready for inspection prior to concealing or enclosing an area containing firestopping materials.
- .2 Arrange for inspections by the Owners independent inspection and testing company, appointed and paid for by Owner.
- .3 Following field inspections, provide all repair as required to ensure compliance with the Contract Documents.
- .4 Keep areas of work accessible until inspection by authorities having jurisdiction.

SECTION 07 84 00 - FIRESTOPPING AND SMOKE SEAL

3.5 CLEANING AND PROTECTION

- .1 Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.
- .2 Upon completion of this work, remove all materials, equipment and debris from the site.
- .3 Leave work area and adjacent surfaces in a condition acceptable to the Consultant.
- .4 Leave installed work with sufficient protection to enable it to remain untouched until project turnover.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|-------------------------------|------------------|
| .1 | Sheet Metal Flashing and Trim | Section 07 62 00 |
| .2 | Firestopping and Smoke Seal | Section 07 84 00 |

1.2 REFERENCE STANDARDS

- .1 ASTM International:
- | | | |
|-----|-------------|--|
| .1 | ASTM C 510 | Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants |
| .2 | ASTM C 719 | Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle) |
| .3 | ASTM C 794 | Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants |
| .4 | ASTM C 834 | Standard Specification for Latex Sealants |
| .5 | ASTM C920 | Standard Specification for Elastomeric Joint Sealants |
| .6 | ASTM C 1087 | Standard Test Method for Determining Compatibility of Liquid- Applied Sealants with Accessories Used in Structural Glazing Systems |
| .7 | ASTM C 1193 | Standard Guide for Use of Joint Sealants |
| .8 | ASTM C 1247 | Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids |
| .9 | ASTM C 1248 | Standard Test Method for Staining of Porous Substrate by Joint Sealants |
| .10 | ASTM C 1311 | Standard Specification for Solvent Release Sealants |
| .11 | ASTM D 2203 | Standard Test Method for Staining from Sealants |

1.3 APPROVED MANUFACTURERS

- .1 The products of the following manufacturers are approved for use subject to meeting the specifications for the particular type of sealants listed below. However, this is not an approval to substitute another type of sealant for those specified unless the material manufacturer requests change in his product in writing to the Consultant.
- | | |
|----|--|
| .1 | Canadian General Electric Company Ltd. |
| .2 | Dow Corning Canada Inc. |
| .3 | Tremco |
- .2 Material manufacturers must be willing to review Shop Drawings and drawing details, visit the site to review sealant installation and provide written reports to the Consultant.

1.4 INSTALLER QUALIFICATIONS

- .1 Sealants and caulking shall be installed by a specialized Subcontractor, having skilled mechanics thoroughly trained and competent in all aspects of caulking work, with minimum 5 years documented experience.

1.5 SUBMITTALS

- .1 Submit samples of each sealant, in conformance with Section 01 33 23.

SECTION 07 92 00 - JOINT SEALANTS

- .2 Provide colour cards for Consultants selection.
- .3 Submit written adhesion and compatibility approval from the sealant manufacturer for all materials to be sealed.

1.6 WARRANTY

- .1 Extend Contractor's warranty to **five (5) years**, in writing. Warranty shall commence on the date of Substantial Performance.
- .2 Defective work shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjacent surfaces
- .3 Provide manufacturer's project-specific 20 year non-staining warranty and 10 year weatherseal warranty for "Type A" sealant listed below.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Sealant Type A: For exterior locations. Non-Staining, primer less, silicone weather-proofing sealant:
 - .1 SilPruf SCS9000 NB, manufactured by Canadian General Electric Company Limited,
 - .2 Dow Corning 756 SMS, manufactured by Dow Corning Canada Inc., or
 - .3 Spectrem 3, manufactured by Tremco Ltd., and
 - .4 conforming to the product properties published.
 - .5 to ASTM C920 Type S, Grade NS, Class 50, Use NT, M, G, A, and O
- .2 Sealant Type B: For interior locations. Non-staining, primer less, silicone hybrid sealant:
 - .1 SCS7000, manufactured by Canadian General Electric Company Limited.
 - .2 Dow Corning 756 SMS, manufactured by Dow Corning Canada Inc., or
 - .3 Spectrem 3, manufactured by Tremco Ltd.
 - .4 to ASTM C920 Type S, Grade NS, Class 50, Use M, G, A, and O
- .3 Sealant Type C: For interior locations where conditions of high humidity exist such as washrooms. Mildew resistant, one component silicone conforming to CGSB 19-GP-22M and ASTM C920:
 - .1 CGE SCS1700 Sanitary Sealant,
 - .2 Dow Corning 786, or
 - .3 Tremco Tremsil 200 White
- .4 Sealant Type D: For interior locations. Paintable, non-staining, primer less, silicone hybrid sealant:
 - .1 SCS7000, manufactured by Canadian General Electric Company Limited.

- .5 Sealant Type E:
 - .1 One-part, moisture cure, medium modulus silicone sealant; Contractors Weatherproofing Sealant (CWS) BY Dow Corning; to ASTM C 920 Type S, Grade NS, Class 50, Use NT, M, A, O (granite).
 - .2 One-part, moisture-cure, low-modulus silicone sealant; Contractors Concrete Sealant by Dow Corning; to ASTM C 920 Type S, Grade NS, Class 50, Use T, NT, M, G, A, O.
- .6 Colours of sealants and caulking when exposed in the finished work to later selection by the Consultant. Allow different colours for different situations and materials. Allow for custom colours for exterior sealants.
- .7 Primers for sealing: As manufactured or recommended by the manufacturer of the sealing materials for the specific applications.
- .8 Joint backing material:
 - .1 circular foam strips, of approved manufacture, compatible with sealant and 50% greater width than joint width;
 - .2 Vertical Surfaces: extruded polyolefin foam, Sof Rod by Tremco Ltd.
 - .3 Horizontal Surfaces: closed cell polyethylene foam, Standard Backer Rod by Tremco.
- .9 Bond Breaker: pressure sensitive plastic tape backing material, which will not bond to sealant; 3M #226 or #481, or Valley Industries #40.
- .10 Cleaning material for surfaces to receive sealant to be as recommended by the manufacturer of the sealant.

PART 3 - EXECUTION

3.1 LOCATIONS

- .1 Seal all exterior junctions and joints wherever required to close gap and wherever sealant is essential to maintain the continuity of air barrier, water barrier, or non-rated smoke separation of wall with Sealant Type A. Areas to be caulked include:
 - .1 Concrete to metal, masonry, concrete and precast concrete.
 - .2 Masonry to metal, concrete, precast concrete, and masonry.
 - .3 Metal to metal, masonry, concrete, and precast concrete.
 - .4 Around pipes and conduit through foundation walls.
 - .5 Between hollow metal frames and screens and adjacent materials.
 - .6 Between metal siding and metal panels and adjacent materials.
 - .7 Between window, louvre, and skylight frames and sills and adjacent materials.
 - .8 At all control and expansion joints.

SECTION 07 92 00 - JOINT SEALANTS

- .2 Seal all interior junctions and joints wherever required to close gap and wherever sealant is essential to maintain the continuity of air barrier, water barrier, or non-rated smoke separation of wall with Sealant Type B. Areas to be caulked include:
 - .1 Concrete to metal, masonry, concrete and precast concrete.
 - .2 Masonry to metal, concrete, precast concrete, and masonry.
 - .3 Metal to metal, masonry, concrete, and precast concrete.
 - .4 Around pipes and conduit through walls.
 - .5 Between hollow metal frames and screens and adjacent materials.
 - .6 At all joints between millwork and masonry, to provide neat junction.
 - .7 At junction between all counters and/or splashbacks and adjacent substrate with neat 3mm bead.
 - .8 At all control and expansion joints.
- .3 Seal with Sealant Type C at the following locations:
 - .1 Around access panels in ceramic tile faced walls with a neat 3mm bead.
 - .2 At junctions between all counter tops and/or splashbacks and adjacent substrate in washrooms, with neat 3mm bead.
- .4 Seal with Sealant Type D at all interior non-moving joints to be painted.
- .5 Seal at all other vertical and horizontal joint locations with Sealant Type E.
- .6 Refer to Section 07 84 00, Firestopping and Smoke Seal, for location of fire stopping and fire resistant caulking.

3.2 SUPERVISION

- .1 Unless specified otherwise herein comply with the recommendations and directions of the manufacturer whose materials are being used on the work.
- .2 Arrange for the sealant manufacturer's technical representatives to visit the site prior to the commencement of the sealing to meet with the Contractor and the Consultant.
- .3 Sealant manufacturer to visit site periodically and to provide written reports to Consultant ensuring sealant is in accordance with good trade practice, the manufacturer's recommendations and the intent of this Specification.

3.3 PREPARATION

- .1 Install sealants only when surfaces and ambient temperatures are suitable for the material used, as per manufacturer's recommendations.
- .2 Clean all joints and spaces to be sealed.
- .3 Ensure that surfaces are structurally sound, free from grease, chalk or other contaminants which may adversely affect the adhesion of the sealing materials. Use dry oil free clean compressed air stream if necessary to clean out the joint.
- .4 Clean surfaces with a solvent or cleaner recommended by the manufacturer of the sealant materials.
- .5 Remove chalk lines completely. Do not place clear sealant over coloured chalk lines.
- .6 Test materials for indications of staining or poor adhesion before any sealing is commenced.
- .7 Submit colour chart to Consultant and obtain his written instructions for colours and locations of colours.

3.4 PRIMING

- .1 If recommended by the manufacturer of the sealing materials, prime joints to prevent staining, or to assist the bond, or to stabilize porous surfaces.
- .2 Apply primer with a brush which will permit the priming of all joint surfaces.

3.5 MASKING

- .1 Where necessary to prevent contamination of adjacent surfaces, mask the areas adjacent to the joints with masking tape.

3.6 INSTALLATION

- .1 Install joint backing materials at all locations as detailed or where required by sealant manufacturer's printed directions.
- .2 Install a bondbreaker tape or packing over asphalt impregnated fibre board as recommended by sealant manufacturer.
- .3 Ensure that the correct sealant depth is maintained.
- .4 Finished joints shall be free of wrinkles, sags, air pockets, ridges and embedded impurities.
- .5 Tool all sealant surfaces to produce a smooth surface.
- .6 Remove droppings and excess sealant as work progresses and before material sets.
- .7 Sealing materials shall be gun grade or tool grade consistency to suit the joint conditions.

SECTION 07 92 00 - JOINT SEALANTS

- .8 Commence sealing only after all adjacent surfaces have been painted under Painting Section.

3.7 CLEANING

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess sealant and droppings using recommended cleaners as work progresses.
- .3 Remove masking after joint tooling.

END OF SECTION

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED WORK

- | | | |
|----|----------------|------------------|
| .1 | Joint Sealants | Section 07 92 00 |
| .2 | Door Hardware | Section 08 71 00 |
| .3 | Painting | Section 09 90 00 |

1.2 WORK INCLUDED

- .1 Supply and install fire rated hollow metal door & frame.
- .2 Work shall including the following:
 - .1 Door cutouts, complete with reinforcing, stops and closers required for glazing.
 - .2 Reinforcing for Finishing Hardware.
 - .3 Supply of all necessary fastening and anchoring devices for above items.
 - .4 Fire rated and labelled doors and frames.
 - .5 Supply and install door silencers on metal frames.

1.3 REFERENCES

- .1 ULC Standards:
 - .1 CAN/ULC-S104 Standard Method for Fire Tests of Door Assemblies
 - .2 CAN/ULC -S105 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104
 - .3 CANULC-S106 Standard Method for Fire Tests of Window and Glass Block Assemblies
- .2 Canadian Steel Door Manufacturers Association (CSDMA):
 - .1 Recommended Specifications for Commercial Steel Doors and Frames
 - .2 Recommended Dimensional Standards for Commercial Steel Doors and Frames
 - .3 Recommended Specifications for Sound Retardant Steel Doors and Frames
 - .4 Canadian Fire Labelling Guide for Commercial Steel Door and Frame Products
 - .5 Guide Specification for Installation and Storage of Hollow Metal Doors and Frames
- .3 CSA Group:
 - .1 CSA W59 Welded Steel Construction (Metal Arc Welding)
- .4 ASTM International:
 - .1 ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - .3 ASTM C553 Specification for Mineral Fiber Blanket Insulation for Commercial and Industrial Applications
 - .4 ASTM C578 Specification for Rigid, Cellular Polystyrene Thermal Insulation
 - .5 ASTM C591 Specification for Un-Faced Pre-formed Rigid Cellular Polyisocyanurate Thermal Insulation

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .6 ASTM C592 Specification for Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction
- .7 ASTM C1289 Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- .5 American National Standards Institute:
 - .1 NFPA 80 Standard for Fire Doors and Fire Windows
 - .2 ANSI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors Frames and Frame Anchors
 - .3 ANSI/DHI A115.1G Installation Guide for Doors and Hardware
 - .4 ANSI A250.11 Recommended Erection Instructions for Steel Frames

1.4 PERFORMANCE

- .1 Doors and frames covered by this specification shall be certified as meeting Level "A" acceptance criteria when tested in strict conformance with ANSI-A250.4. Swing Test duration shall be 1,000,000 cycles. For door twist tests maximum deflection is not to exceed 32mm (1 ¼ ") when loaded to 136kg (300 lbs), and permanent deflection is not to exceed 3.2mm (1/8"). Tests shall be conducted by an independent nationally recognized accredited laboratory.
- .2 Fire labelled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Consultant. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN/ULC-S104. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service Procedures issued to the manufacturer.
- .3 Should any door or frame specified by the Consultant to be fire rated, not qualify for labelling due to design, hardware, glazing or any other reason, advise the Consultant before manufacturing commences.
- .4 Product quality shall meet, or exceed, standards set by the Canadian Steel Door Manufacturers Association.

1.5 SUBMITTALS

- .1 Submit confirmation that the manufacturer can label all fire rated doors, frames, and screens, glazed with the fire rated glass to be used on the project, for the fire separation required.
- .2 Prepare and submit shop Drawings in accordance with Section 01 33 23, and show the following:
 - .1 Door and frame schedules, identifying each unit, with door numbers referencing the numbering in the contract documents.
 - .2 Provide columns for Stock Code Numbers for both doors and frames.
 - .3 Typical and special details; including mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, panelled or louvered) and arrangement of hardware.
 - .4 Materials and finishes; including steel, core, material thickness.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .5 Hardware preparation.
- .6 Frame anchorage details.
- .7 Submit manufacturer's standard catalogue data for specified products demonstrating compliance with referenced standards.
- .8 Other pertinent information.
- .3 Submit information on standard shop drawing sheets as approved by the Canadian Steel Door and Frame Manufacturers Association.
- .4 Shop drawings for hollow metal screens over 8m² in size, and for all screens which are required by code to be designed as guards at variations in floor level, must be sealed by a professional engineer, registered in the Province of Ontario.
- .5 Submit manufacturer's printed installation instructions.
- .6 Operation and Maintenance Data: Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 PRODUCT HANDLING

- .1 Matchmark doors, panels, frames and windows with Stock Code Numbers as shown on the Door Schedule. If Stock Code Numbers are not shown on the Schedule, matchmark with Door Numbers.
- .2 Deliver, store and handle components so as to prevent damage, distortion and corrosion.
- .3 Store Steel Frames under cover, raised on wood skids at least 100mm above grade, and as required to prevent damage and rusting. Store assembled frames in an upright position. Stack frames to prevent twisting; maximum 5 units per stack. Provide minimum 6mm airspace between frames to permit air circulation. Covers must be vented so as to avoid a build-up of humidity within.
- .4 Doors to be delivered to site immediately prior to installation. Store doors protected at corners to prevent damage or marring of finish. Store in upright position, in enclosed, dry space, in a manner to prevent rust and damage. Use vented covers.

1.7 WARRANTY

- .1 Provide an extended warranty of **three (3) years** from date of Substantial Performance against defects of workmanship including failure of welded seams or of reinforced hinge anchorage plates. Work showing defects during this period shall be repaired or replaced without cost to the Owner.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 2 - MATERIALS**2.1 MATERIALS**

- .1 General: All materials shall be new and suitable for their various purposes and shall be free from flaws and imperfections.
- .2 All doors, frames, and screens shall be from one manufacturer. Only the following manufacturers will be accepted:
 - .1 Manufacturers:
 - .1 Fleming Baron Door Products (Assa Abloy)
 - .2 Daybar Industries Ltd.
 - .3 All Steel Doors
 - .4 Gensteel Doors
 - .5 Trillium Steel Doors
 - .6 Vision Hollow Metal
 - .2 Manufacturers must be able to provide and label the fire rated doors, frames, and screens required for this project, using the fire glass specified. If the manufacturer carried in the tender is not capable of providing the fire labelled products, the contractor will be required to use one of the other listed manufacturers for the work, at no additional cost to the Owner.
- .3 Sheet Steel:
 - .1 General: cold rolled, carbon steel, stretcher levelled. Steel to have hardness of Rockwell 'B' maximum 65 (ASTM E103) suitable for forming and bending without metal or coating fracture.
 - .2 ASTM A653/A653M commercial grade tension levelled hot-dipped galvanized steel sheet, coating designation Z275
 - .3 Doors, over 3m²: commercial quality zinc coating, comply with ASTM A1008/A1008M.
- .4 Steel Thicknesses:
 - .1 Doors: 1.6mm [16ga]
 - .2 Panels: 1.3mm (18 ga)
 - .3 Frames: 1.6mm (16 ga)
 - .4 Hinge Reinforcement: 3.5mm (10 ga)
- .5 Door Materials:
 - .1 Interior doors and panels up to 3m² and maximum width of 1200mm or maximum length of 3000mm:
 - .1 Doors to be Fleming D-Series, 16 gauge, or equivalent.
 - .2 Interior Doors to be Honeycomb Core, except high use doors which shall be as specified above.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .6 Fire rated doors: in accordance with fire test requirements.
 - .1 locate U.L.C. label on inside of hinge jamb on frame.
 - .2 locate U.L.C. label on the top hinged edge of door midway between top hinge and top of door. Doors to be as noted above.
- .7 Honeycomb: Structural small cell (25.4 mm max) Kraft paper "Honeycomb"; weight: 36.3kg per ream minimum; density: 16.5kg/m³ minimum.
- .8 Frame reinforcement:
 - .1 Reinforce frames for high frequency hinge preparation.
 - .2 Stiffen all mullions and hinge jambs with continuous 3.5mm channel where continuous hinges are required.
 - .3 Reinforce and provide cut outs and boxes for security devices.
 - .4 Reinforce for overhead stops.
 - .5 Frames at acoustic doors to be filled with mortar.
- .9 Metal Filler: Two component epoxy type.
- .10 Primer: Rust inhibitive primer
- .11 Door Silencers: Rubber - Ives SR64 or approved equal.

2.2 FABRICATION

- .1 General
 - .1 Dissimilar metals in contact, or metals which will be in contact with concrete or masonry when installed, shall be insulated one from another by methods and materials required for such results, as approved by the Consultant.
 - .2 Components shall be the types and sizes shown on the Drawings.
 - .3 Reinforce components, where required, for the installation of Finishing Hardware. Drill and tap to suit templates.
 - .4 Prepare doors and frames for the installation of the security system. Confirm requirements with Consultant.
 - .5 Ensure adequacy of anchoring devices.
 - .6 No patching, plugging, skimming or other such means of overcoming defects, discrepancies or errors shall be resorted to without written permission of the Consultant.
 - .7 Fabricate components from clean steel, free of rust and scale, which has been thoroughly degreased.
 - .8 The dimensions shown on the Drawings are the full rebate size of the frame.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .9 In addition to specified requirements for hollow metal doors and frames, fire doors and frames shall comply with the Underwriters Laboratories requirements for the specified rating and be provided with the appropriate labels.
- .2 Edge Clearances
 - .1 Unless otherwise specified, allow edge clearances in accordance with Canadian Manufacturing Specifications for Steel Door and Frame Manufacturers Association.
 - .2 Where hardware items are to be attached to, or mortised into, bottom edges of doors, provide proper clearance between door and floor or threshold to accommodate such hardware.
- .3 Hardware Preparation
 - .1 Refer to Hardware Schedule, included in Section 08 71 00, and prepare doors for hardware listed.
 - .2 Templated hardware: prepare work in accordance with templates supplied in Section 08 71 00. Prepare doors for mortice locksets according to Hardware Schedule.
 - .3 Reinforce doors and frames for concealed, mortised and surface mounted hardware in accordance to "Thickness of Steel for Component Parts" in the "Canadian Manufacturing Standards for Steel Doors and Frames", published by the Canadian Steel Door and Frame Manufacturers' Association.
- .4 Hollow Metal Doors and Panels
 - .1 Doors and panels shall be of seamless, continuously welded construction with no visible seams or joints on faces. Doors to be 44.4mm minimum thickness.
 - .2 Secure edge seams with suitable continuously welded seams to the approval of the Consultant.
 - .3 Interlocking seams for doors shall be fully seam welded, for full length of door. All welding to be ground smooth.
 - .4 Core construction:
 - .1 Doors to be steel reinforced. All Type H doors to be steel stiffened as specified herein.
 - .2 All interior doors shall have steel reinforcing.
 - .5 Welds shall be ground, filled, and dressed smooth to provide an invisible joint and smooth flush surface.
 - .6 Fully reinforce doors as required for specified hardware.
 - .7 Close top and bottom edges of doors with a continuous, recessed, minimum 1.5mm thick steel channel, extending full width of door and welded to both faces.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .8 Surround openings in doors with minimum 1.5mm thick steel edge channels, welded to both face sheets.
- .9 Vertical edge profile for single acting swing doors: bevelled 3mm in 50mm.
- .10 Construct fire rated doors to meet fire test requirements and provide U.L.C. labels.
- .5 Steel Frames
 - .1 Frames shall be of sheet steel, formed profiles shown on the Drawings.
 - .2 Fabricate frames in sections as large as practicable to minimize field jointing. Internally reinforce all mullions and hinge jambs with 1.3mm channel.
 - .3 Steel thickness: 1.6mm (16 ga.) galvanized steel.
 - .4 Glazing stops shall be as specified for doors above.
 - .5 Assemble components with accurately cut joints. Mitre outside corner joints of frames. Continuously weld joints on inside of profile; grind welds flush and sand to smooth uniform surface. Provide semi-rigid insulation to exterior frames.
 - .6 Tack weld two (2) removable 1.2mm steel spreader channels to inside faces of door frames at base, for protection during shipping.
 - .7 Provide adjustable base clips at bottom of each door jamb for anchorage to floor.
 - .8 Provide button type rubber silencers; three per strike jamb of single doors: two per head member of double door frames.
 - .9 Prepare door frames for ANSI strike, where doors to be fitted with latchsets or lockets.
 - .10 Provide removable mullions where noted. Reinforce removable mullions with 3.5mm channel to prevent forcing of latching hardware.
 - .11 Masonry Anchors:
 - .1 At interior frames, provide masonry anchors of 1.5mm galvanized corrugated tee anchors or 3mm diameter galvanized wire anchors - supplied loose, at rate of 3 per jamb up to 2.2m high; one additional per jamb for each 0.6m over 2.2m high. Frames for observation windows shall be provided with 2 anchors per jamb.
 - .12 Provide two 38mm by 38mm by 4.8mm thick steel stiffening angles in the head member of frames for two or more doors totalling over 1980mm, wide. Provide necessary vertical stiffeners where required and carry to structure above. Provide stiffener angles in all exterior door jamb with sidelights and in all centre mullions between doors.
 - .13 Mounting bars for sidelights shall be as detailed on the Drawings and shall be completely filled with glass fibre insulation.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

- .14 Frames at STC rated doors shall be mortar filled to meet door manufacturers requirements for the STC rating.

PART 3 - EXECUTION**3.1 GENERAL**

- .1 Store doors and frames as specified under item 1.7, Product Handling, above.
- .2 When installing frames during cold weather, installer to coat inside of frames with a corrosion inhibiting bituminous product, prior to installation, to protect against cold weather additives in masonry grout.
- .3 Silencers, gaskets, etc., are to be installed in holes in frames prior to installation of frames; so to avoid filling these holes with grout during installation.
- .4 Keep steel surfaces free of grout, tar, other bonding materials, and sealers; clean surfaces immediately following installation.

3.2 INSTALLATION

- .1 Frame and Screen Installation
 - .1 Remove all steel spreaders, which are provided to avoid damage during shipping. Provide wood spreaders at base and midpoint of frames. Wood spreaders to be min. 38 x 89mm lumber, notched to clear frame stops; width to be equal to opening between jambs at header level. Wood spreaders to remain in place until frames are set permanently in walls.
 - .2 Set frames and screens plumb, square, aligned, without twist and at correct elevation. Maximum allowable limits of distortion shall be as follows:
 - .1 Plumbness: Not more than 1.6 mm out of plumb, measured using a line from the intersection of vertical members and the head to the floor.
 - .2 Squareness: Not more than 1.6 mm difference between diagonal measurements between corners.
 - .3 Alignment: Not more than 1.6 mm, measured on jambs, through a horizontal line parallel to the plane of the wall.
 - .4 Twist: Not more than 1.6 mm, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall.
 - .3 At masonry walls, build in frames using the corrugated or wire masonry anchors. Brace frames solidly in position while being built in, with wood spreaders as noted above. Provide vertical support at centre of head for openings exceeding 1200 mm in width.
 - .4 After installation, fill countersunk screw heads flush with frame and sand smooth ready for painting. Fill exterior frames with glass fibre batt insulation. Cooperate with masonry trade to fill interior frames with mortar.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

.2 Door Installation

- .1 Install hollow metal doors plumb and true.
- .2 Co-ordinate installation of hardware.
- .3 Adjust operable parts to ensure proper operation. Lubricate using a suitable lubricant compatible with door and frame coatings.
- .4 Install hollow metal panels with concealed fastenings.

3.3 **TOUCH UP**

- .1 Remove rust, clean and touch up any damaged galvanizing with "ZRC 221" coating.
- .2 Remove rust, clean and touch up any damaged paint with approved rust inhibitive primer.

3.4 **CLEANING AND PROTECTION**

- .1 Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged products. Clean installed products in accordance with manufacturer's instructions before Owner's acceptance.
- .2 Remove construction debris associated with this work from project site, and dispose of in accordance with applicable laws.
- .3 Protect installed products and finished surfaces from damage during construction.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- | | | |
|----|--------------------------|------------------|
| .1 | Demolition & Alterations | Section 02 40 00 |
| .2 | Mechanical | Divisions 21, 23 |
| .3 | Electrical | Divisions 26, 27 |

1.2 CEILING SYSTEMS

- .1 This Specification includes the ceiling systems listed below, noted in schedules and shown on reflected ceiling plans.
- .2 Ceiling systems shall be 610mm x 1220mm lay in exposed Tee system, rated. Rated ceiling systems to conform to U.L.C. details R210 and ULC I217

1.3 REFERENCE STANDARDS

- | | | |
|----|---------------|--|
| .1 | ASTM C635 | Specifications for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings |
| .2 | ASTM C636 | Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels. |
| .3 | CAN/CGSB 92.1 | Sound Absorptive Prefabricated Acoustical Units |

1.4 DESIGN

- .1 N.R.C. Range: Unless otherwise noted under description of ceiling system the N.R.C. Range shall be 60-65 (Table 1 of CAN/CGSB 92.1).
- .2 Ceiling S.T.C.: Unless otherwise noted under description of ceiling system the S.T.C. rating shall be 35 or better.
- .3 Light Reflectance: Unless otherwise noted under description of ceiling system, panels shall have a light reflectance co-efficient designation of L.R.1 (0.75 minimum). Table 3 of CAN/CGSB 92.1 refers.
- .4 Support of HVAC and Electrical Equipment:
- | | |
|----|---|
| .1 | Provide additional hangers as required for support of light fixtures and radiant panels, mechanical diffusers, sound diffusers, etc. |
| .2 | Provide wider tee and wall moulding where ceiling grid supports radiant ceiling panels. Note that radiant panels weight a minimum of 2.5 lb/sq. ft. |

1.5 SHOP DRAWINGS

- .1 Reflected ceiling plans indicate proposed layout but this shall not relieve Contractor of responsibility for co-ordination of the work and provision of Shop Drawings where field conditions call for variation from proposed layout.

SECTION 09 51 00 - ACOUSTIC CEILINGS

- .2 Accurately locate lighting fixtures, ventilating grilles, sprinkler heads, exit lights and other ceiling fittings.

- .3 Conform to Section 01 33 23.

1.6 SAMPLES

- .1 Upon award of the Contract submit full size sample panels proposed for installation in the project. All panels subsequently used on the job shall match the approved sample.
- .2 Submit samples of suspension system members for approval prior to commencement of installation.

1.7 DELIVERY AND STORAGE

- .1 Transport, handle and store material in manner to prevent warp, twist and damage to tile and board edges and surfaces in accordance with the manufacturer's recommendations.
- .2 Any warped and/or damaged boards, tile and trim shall be rejected and be replaced by new, straight, undamaged and acceptable materials at no cost to the Owner.
- .3 Store material in warm, dry place away from water and the elements. Protect against undue loading stresses and shock.
- .4 All packaged material shall be delivered in original manufacturers' wrappers and containers with labels and seals intact.

1.8 PROTECTION

- .1 Exercise care in the execution of work under this Section to prevent damage to finished surfaces and adjacent work, and mechanical and electrical installations.

1.9 EXTRA PANELS

- .1 Provide 2% typical acoustic panels of each type specified for use in maintenance work. Obtain receipt from the Consultant or Owner's representative on site.
- .2 Do not use panels supplied to Owner for maintenance work to make good any damaged or removed tile required by Contract.

1.10 SPECIAL CLEANING

- .1 Clean, repair or replace dirty, discoloured or defective units or exposed suspension members to Consultant's satisfaction.

1.11 ENVIRONMENT

- .1 Commence installation after building enclosed and dust- generating activities completed.
- .2 Permit wet work to dry prior to commencement of installation.

SECTION 09 51 00 - ACOUSTIC CEILINGS

- .3 Maintain uniform minimum temperature of 15 deg. C. and humidity of 20% to 40% prior to, during and after installation.

1.12 **WARRANTY**

- .1 The Warranty stipulated in the General Conditions of the Contract shall be deemed to include the following definition in reference to Work specified in this Section. The following will be considered defects without being limited thereto:
 - .1 Failure of the suspended ceiling to remain water level.
 - .2 Lifting or sagging of tile and board between supports.
 - .3 Staining and discolouration of factory finishes.
 - .4 Development of corrosion of galvanized ferrous metal.
 - .5 Development of cracks, splits and other surface deterioration in acoustic panels.
 - .6 Failure of hanging wire anchorage.
- .2 The warranty period shall be **two (2) years**, commencing on the date of Substantial Performance of the Work.

PART 2 - PRODUCTS

2.1 **MATERIALS - LAY-IN SYSTEM**

- .1 Acoustic Ceiling Panels
 - .1 LAT 1: Classrooms, corridors, etc.
610mm x 1220mm, min. NRC of .70, CAC min. 40, fire guard; CGC Radar High NRC/CAC panels 22541 or Armstrong School Zone Fine Fissured 1811.
All tile and suspension systems shall be fire rated.
- .2 Suspension
 - .1 Suspension system to be "DX" 24mm wide faced T-bar by CGC. Equivalent grid by Chicago Metallic, or Armstrong will be accepted, contingent on its compatibility with the specified ceiling tiles.
 - .2 Provide rated grid.
 - .3 Exposed interlocking tee grid system, formed out of cold rolled zinc-bond steel 0.54mm thick.
 - .4 Main Tees: 38mm x 25.4mm double web rectangular bulb top with capping plate in precoat baked-on white paint finish and incorporating holes for hangers and slots for connecting pieces, and capable of supporting 12.5 kg per 1200mm. for continuous spans and 6.5 kg per 1200mm span for single span without exceeding a deflection fo 1/360 of the span.

SECTION 09 51 00 - ACOUSTIC CEILINGS

- .5 Standard Cross-Tees: 25.4 x 25.4mm double web, bulb top, capping plate in precoated white baked-on finish, capable of supporting 11.3 kg per 600mm span without exceeding a deflection of 1/360 of span, and with positive interlock with main tees.
- .6 Structural Cross-Tees as main tees, but with crimped ends for lapping bottom flange of main tees and interlocking tack ends to engage slots in main tees.
- .7 Suspension system at radiant panels shall be CGC wide face grid, Type "DXW", 38mm wide, or equivalent by one of the approved grid manufacturers listed above.
- .8 Accessories:
 - .1 Splice plate, clips, screws, etc. as required to complete the installation. All galvanized finish.
- .9 Concealed flat spline: 0.71mm flat steel spline.
- .10 Edge Trim:
 - .1 0.635mm zinc bonded, cold rolled steel mould.
 - .2 Trim shall be minimum 22mm x 22mm angles.
 - .3 Provide 50mm wide shadowline trim at perimeter of corridor ceilings.
 - .4 Provide 50mm wide trim at radiant ceiling panels adjacent to walls.
- .11 Finish to tees and edge trim: flame resistant white baked enamel satin finish to match panel finish, 2 coats on exposed surfaces, 1 coat elsewhere.
- .12 Carrying Channels: 38mm x 19mm cold rolled galv. weighing 1.042 kg per metre.
- .13 Tie Wire: 1.6mm galvanized soft annealed steel
- .14 Hangers: 2.6mm galvanized steel wire.
- .15 Screws: Corrosion resistant, self-tapping Philips truss head, of length and gauge to suit installation.
- .16 Ceiling Hanger Pins (for fixing to metal): capacitor discharge ceiling hanger pins, by Continental Studwelding Ltd., or approved equivalent, of type approved by Consultant.

PART 3 - EXECUTION**3.1 INSTALLATION - GENERAL**

- .1 Employ mechanics skilled in this Trade and install work in strict accordance with the system manufacturer's printed directions to produce a first class, true finish, free from dropping, warpage, soiled or damaged tile.

SECTION 09 51 00 - ACOUSTIC CEILINGS

- .2 Make provisions for thermal movement.
- .3 Install hanger inserts in a manner approved by Consultant.
- .4 Locate hangers directly over Main Tees and as close to intersections as possible. Secure hangers firmly to concrete inserts, steel joists and beams, bracing, etc. Do not install hangers to roof deck, provide separate grid off joists if required.
- .5 Erect ceiling grid plumb and square with accurately fitted locked-in joints in true alignment, secure and rigid and with provision for thermal movement. Water level ceiling to tolerance of 1mm in 1m and maximum deviation of 4mm. from mean level.
- .6 Frame around recesses fixtures, diffusers, grilles, radiant panels, and the like and provide heavier section hangers and supports as necessary to support same. Provide hanger within 150mm of each fixture corner.
- .7 Consult with Electrical and Mechanical Trades for requirements and provide access to valves and switches. Provide wide face tees and trim at radiant ceiling panels.
- .8 Ensure that all hangers and carrying members are designed and spaced to support entire ceiling system including recessed lighting fixtures. Note, weight of fixtures is approximately 9-13.5 kg.
- .9 Install panels only after all mechanical and electrical equipment, conduits, piping, telephone distribution, etc. are in place.
- .10 Typical ceiling panels shall be type LAT1.

3.2 **INSTALLATION OF LAY-IN SUSPENSION SYSTEM**

- .1 Generally hangers shall be spaced at not more than 1200mm o.c. directly above main runner tees, except at fixtures, where they shall be 600mm o.c. or closer as required to adequately support fixtures. Locate hangers as close as possible to tee junctions. Locate first hanger within 300mm of perimeter wall.
- .2 Install main tee runners continuous at 1200mm o.c. with interlocking structural cross-tees each side of fixtures at right angles to main tees. Install standard cross-tees generally at 90 degrees to main tees and as required to achieve pattern shown on reflected ceiling plans. Secure joints by web of tees; snaplock into place forming rigid connections. Main tees shall be as long as possible with butt ends joined by means of splice plates locked into webs.
- .3 Frame up around light fixtures, grilles, diffusers, speakers, openings, etc. as required.
- .4 Secure edge mouldings to walls, bulkheads and other vertical surfaces at perimeter edges of acoustic ceilings. Note special mouldings required.
- .5 Securely fix hangers to tees by bending ends 90 degrees at the correct height and inserting through holes in top of main tees, then wiring around open side at least 3 turns twisting ends together. Flats shall be bolted to tees. Secure to concrete inserts in similar manner.

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3.3 LAY-IN PANEL INSTALLATION

- .1 End panels shall not be less than half full size and installation in each area shall be symmetrical, with end tiles and abutting opposite vertical wall surface to be of the same width. Do all necessary cutting and fitting neatly and accurately to suit grid openings and accommodate fixtures, grilles, detectors, speakers and the like located on the ceiling panels.
- .2 Lay directionally patterned acoustic panels in one direction, parallel to the longest direction of the grid concerned.
- .3 Place panels between tees so that edges bear evenly on flanges.
- .4 Conform with reflected ceiling plans.
- .5 Provide fire rated enclosures as required around light fixtures and mechanical equipment in fire rated ceilings, according to applicable ULC I217 and R210 Design Criteria.
- .6 Where mechanical equipment is located above the ceiling, panels shall be suitably and inconspicuously marked by the use of small colour-coded stickers. Mechanical equipment to be located shall include valves, dampers, heat exchangers, heat pumps, VAV boxes, electrical disconnects, as applicable, and other such equipment not visible from below.

3.4 CLEANING

- .1 Upon completion, clean acoustic tile of all finger marks and other defacements.
- .2 Remove all accumulated rubbish and excess materials from the site.
- .3 Clean acoustic tile and replace any damaged tiles immediately before occupation of building by Owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- .1 Demolition and Alterations Section 02 40 00

1.2 SCOPE OF WORK

- .1 Repair and alterations to terrazzo flooring and terrazzo cove base in corridors and kitchen
- .2 Provide terrazzo floor finish, bonded on concrete slab, to match existing. Existing drawings indicate a 38mm depth of terrazzo; assumed to consist of 16mm terrazzo topping on 49mm underbed.
- .3 Work included:
- .1 inspection of surfaces and conditions
 - .2 divider strips to match existing
 - .3 primer
 - .4 Portland cement terrazzo mixes
 - .5 installation of flooring and bases
 - .6 surfacing and grouting
 - .7 cleaning and sealing
- .4 Chip out floor and provide integral terrazzo floor and cove base.

1.3 REFERENCES

- .1 Do terrazzo work in accordance with 2002 Terrazzo Specification Guide 09400 produced by Terrazzo Tile and Marble Association of Canada (TTMAC).
- .2 Conform to the following standards:
- .1 CAN/CSA-A5 Portland Cement
 - .2 CSA A194.1 Terrazzo Aggregate
 - .3 ASTM C-144 Standard Specification for Aggregate for Masonry Mortar
 - .4 ASTM A821M Standard Specification for Steel Wire, Hand Drawn for Prestressing Concrete Tanks
 - .5 ASTM A185M Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
 - .6 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction
 - .7 CAN/CGSB-25.20 Surface Sealer For Floors
 - .8 CAN/CGSB-2.107 General Purpose Built Liquid Detergent

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.9 CAN/CGSB-25.21 Detergent Resistant Floor Polish

.10 TTMAC 2000 Maintenance Guide

.11 TTMAC 09400 Terrazzo Specification Guide 2002

1.4 QUALITY ASSURANCE

- .1 Installer shall be a member in good standing of the TTMAC, with a minimum of 5 years experience in similar work. Installer must employ skilled mechanics trained and experienced in terrazzo work.
- .2 Supplier shall be a member in good standing of the TTMAC, providing materials which meet the minimum standards of the TTMAC.

1.5 SUBMITTALS

- .1 Submit three (3) samples 152mm x 152mm of each color and type of terrazzo for approval by the Consultant. Submit samples (305mm in length) of all specified divider strips and control joints.
- .2 Show shop drawings showing locations of all joints. Provide details where new terrazzo flooring meets existing, and where it meets other floor finishes. Indicate depth of and area of depressed concrete slab required. Note all colours on drawings.
- .3 Submit three (3) copies of the latest edition of the TTMAC Maintenance Guide, to be included in the Maintenance Manuals specified in Section 01 78 00. Include specific warnings of any practices which could damage the materials or decrease slip resistance of the surface.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle products in a manner to avoid damage. Store materials in a clean, dry heated location furnished by others.
- .2 Material must be conditioned to ambient temperatures for a period of 24 hours prior to installation.

1.7 PROJECT CONDITIONS

- .1 Examine areas where the work of this section is to be located.
- .2 Ensure that concrete slab is properly cured, is at proper level to receive terrazzo, and is clean, smooth and free of curing compounds. Slab temperature must not be less than 12°C.
- .3 Do not place terrazzo until unacceptable conditions have been corrected.
- .4 Protect work during installation and protect finished corners exposed to construction operations and traffic.

1.8 WARRANTY

- .1 All terrazzo work, shall be warranted for one year from date of Substantial Performance.

PART 2 - PRODUCTS

2.1 MATERIALS

- | | | |
|-----|---|---|
| .1 | Cement: | Portland cement to CAN CSA-A5, with colouring to suit selected sample |
| .2 | Sand: | Sharp, screened sand: ASTM C-144 |
| .3 | Water: | Clean water, free from oil, acids, alkali or organic matter |
| .4 | Polyacrylate Plastic Matrix Terazzo: | |
| .1 | Liquid polyacrylate copolymer, dry coreactive and pigment | |
| .5 | Aggregate: | Marble, granite, onyx, plastic or glass chips; clean and sound; colours to match existing |
| .6 | Colour pigments: | Non fading mineral pigments |
| .7 | Slip resistant material: | No. 36 grit aluminum oxide |
| .8 | Slip resistant channel strips: | Brass or zinc 10mm x 10mm, 20 gauge dove-tailed shaped channels with anchor tapes |
| .9 | Reinforcing mesh: | 51 x 51mm mesh size, fabricated from 1.6mm thick galvanized wire/fabric welded mesh. ASTM A821/ASTM A185 |
| .10 | Divider Strips: | 25mm to 32mm deep with anchorage devices, except where specified otherwise, 14 gauge zinc. To match existing in appearance. |
| .11 | Cleavage Plane: | 4 mil thick polyethylene film, to CAN/CGSB-51.34 |
| .12 | Crack Isolation Membrane: | As specified, install as per manufacturer's recommendations |
| .13 | Cleaners: | Conforming to CAN/CGSB-2.107 |
| .14 | Sealers: | Conforming to CAN/CGSB-25.20 |
| .15 | Floor Finish: | Conforming to CAN/CGSB-25.21 |

2.2 MIXES/PROPORTIONS - AT POURED-IN-PLACE CONCRETE

- .1 Underbed:
.1 One part Portland cement to four parts sand by volume.

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- .2 Wet and mix thoroughly to a low slump to provide workability. Adjust water volume depending on moisture content of sand to obtain consistency and workability.
- .2 Scratch Coat (by volume):
 - .1 One part Portland cement, 4 parts sand and latex additive if required.
 - .2 Adjust water volume depending on moisture content of sand to obtain consistency and workability.
- .3 Slurry Bond Coat: Mix Portland cement and water to a creamy paste consistency. Latex additive may be included to increase bond.
- .4 Terrazzo topping to consist of 2 parts cement to three parts aggregate. Chip size ratio 70% No. 2 and 30% No. 1, unless otherwise required to match existing.
- .5 Epoxy Bonded Terrazzo Topping: Same mix as standard terrazzo topping with a specified epoxy bonding agent.
- .6 When mixed with water the underbed shall be of such a consistency and workability that will allow maximum compaction during tamping of the underbed, and achieve a minimum compressive strength of 15 Mpa (2000 psi) after 28 days. A stronger mix can be achieved by adding a latex additive to the water.

2.3 MIXES/PROTECTIONS - OVER PRECAST SLABS

- .1 Concrete to be free of cracks, contaminants and curing compounds. Finish to be fine broom on steel trowel.
- .2 100% solid epoxy mortar.

PART 3 - EXECUTION**3.1 INSPECTION**

- .1 Verify existing conditions are ready to receive work.
- .2 Verify substrate surfaces are clean, dimensionally stable, cured and free of contaminants.
- .3 Verify that concrete has been allowed to cure for a minimum of 28 days.
- .4 Notify Consultant in writing of unacceptable substrate conditions. Beginning of installation implies acceptance of existing conditions.

3.2 PREPARATION

- .1 Substrate is to be depressed to accommodate the terrazzo system, depressions from the finished floor level to be no less than 75mm for a floating terrazzo floor.

3.3 INSTALLATION

- .1 Demolition: Chip out existing terrazzo and underbed to nearest control joint location and prepare for new terrazzo to match existing.
- .2 Install terrazzo flooring in conformance with TTMAC detail 411F-2002, Portland Cement Terrazzo Floating Floor System.
- .3 Underbed: Install underbed over substrate and screed to required levels. The levels should allow for the thickness of the terrazzo topping in order to provide a flat and continuous transition between terrazzo and adjacent flooring. Permit underbed to cure for a minimum 48 hours prior to installation of terrazzo topping.
- .4 Divider strips: Install divider strips in underbed while still in plastic state. Set strips true and level to required pattern. Terrazzo panels created by the installation of divider strips should be no greater than 1200mm x 1200mm. Structural or movement joints must be addressed by mechanical devices. Divider strips are not intended to replace or to be used as structural expansion joints.
- .5 Provide control joints in terrazzo over cold joints in concrete slab. The divider strips required for these control joints shall be in addition to those required to replicate the pattern of the existing floor.

3.4 INSTALLATION OF TERRAZZO TOPPINGS

- .1 Standard terrazzo topping: Allow underbed to cure for 48 hours, sweep or vacuum underbed, saturate with water and remove excess. Apply a cement slurry bond coat and immediately follow with application of terrazzo topping mix. Wet terrazzo topping mixture, mix thoroughly and spread with trowel level to top of strips. Sprinkle topping with dry aggregate chips. Roll with heavy rollers to compact topping until excess cement and water has been extracted. Hand trowel topping surface flush with top of divider strips to close all voids and pin holes. Control cure a minimum of 48 hours. After floor has sufficiently cured, grind with No. 24 grit abrasive stones or with diamond plugs. Follow initial grind with No. 80 grit of finer stones, to a maximum of 120 grit, remove excess, rinse with clean water and apply grout by hand trowel or machine to fill all voids. Let grout cure for a minimum of 48 hours and re-grind with No. 80 grit of finer stones, to a maximum of 120 grit, until all grout is removed from surface. Let surface dry thoroughly and apply sealer as per manufacturer's recommendations.
- .2 Aggregate chip coverage must show a density in excess of 90% exposure on the finished terrazzo surface.

3.5 PATCHING

- .1 Remove and replace all defective or damaged work promptly and when directed by the Consultant.

3.6 CLEANING/SEALING

- .1 Refer to latest TTMAC Maintenance Guide.

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3.7 PROTECTION

- .1 Standard protection includes 1 layer of Kraft paper. Contractor to provide adequate protection to completed terrazzo work. Protect work of other trades. Prohibit traffic during installation and for 48 hours after completion. Protect floor from impact and vibration for a minimum of 48 hours after installation. Protect base from impact, vibration, heave hammering on adjacent and opposite walls.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Demolition and Alterations	Section 02 40 00
.2	Metal Fabrications	Section 05 52 00
.3	Rough Carpentry	Section 06 10 00
.4	Finish Carpentry	Section 06 20 00
.5	Custom Cabinets	Section 06 41 00
.6	Wood Doors	Section 08 14 00
.7	Gypsum Board System	Section 09 29 00
.8	Mechanical	Divisions 20, 21, 22, 23, 25
.9	Electrical	Divisions 26, 27,28

1.2 SCOPE OF WORK

- .1 This Section is intended to cover all repainting of existing surfaces and painting of new surfaces in renovated areas, both interior and exterior. With the exception of painting specifically called for in other Sections of the Specifications, all painting work is included in the scope of this Section of the Specification. Painting of new mechanical to be done as per item 3.6.
- .2 Colours will be specified at a later date by the Consultant, allow for accent walls of primary colour to some areas. Unless otherwise noted on room finish schedule, new painting will match existing colours in renovated areas.
- .3 In locations where drawings and Room Finish Schedule do not call for paint or similar finish on walls and/or ceilings, the intent of this Specification is that all new work and existing surfaces in areas affected by the Work of this project, including miscellaneous metal work, shall be painted.
- .4 In renovated areas, paint all affected walls in accordance with the paint systems specified. All other walls in the same room are to be cleaned, prepared, and repainted, unless specified otherwise. If finish schedule indicates that new colours will be required, existing walls will require a prime coat and of two coats of finish paint. If more than one colour is present, or called for, in the room, confirm colours with Consultant.
- .5 Work includes:
 - .1 testing of substrates for moisture and alkalinity
 - .2 surface preparation of substrates as required for acceptance of paint, including sanding, cleaning, small crack repair, patching, caulking, and making good surfaces
 - .3 recoatability testing
 - .4 pre-treatments, sealing, and priming of surfaces
 - .5 painting of existing and new surfaces in accordance with specified systems
 - .6 provision of adequate ventilation and safe working conditions
 - .7 clean up and protection
- .6 Paint all new exterior surfaces which normally require painting, including hollow metal doors, screens, soffits, roof fans and hoods, galvanized steel lintels, ladders, bollards, steel gates and hardware, metal fencing. All new woodwork on exterior must be fully primed before erection or be of pressure treated wood. Paint all altered and repaired exterior surfaces.

SECTION 09 92 00 - PAINTING & REPAINTING

- .7 Perform interior painting called for in Room Schedule and Door Schedule and noted on drawings. Paint all new walls, ceilings, bulkheads, tectum, and all surfaces which normally receive a paint finish, whether noted on schedules, or not noted. Walls shall be completely painted before installation of new tackboards, writing boards, millwork, lockers, etc.
- .8 All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (other than stainless steel, anodized aluminum and baked enamel) to be painted to match the surfaces on which they occur, unless otherwise directed by Consultant.
- .9 For special painted graphics, colour changes, accent stripes, etc. see drawings.
- .10 Paint exposed drywall and the like in locations where finish is not otherwise specified or noted. Do not paint such surfaces in mechanical shafts, unless specifically noted.
- .11 Paint all new exposed structural steel and mechanical ducts in finished areas. Paint new items to match existing. Where colour change is required schedules, repaint existing structural steel and ducts also.
- .12 Paint all new exposed structure and metal deck, except Water Meter and Electrical Rooms.
- .13 Paint pipes, conduit, ducts and related thermal insulation and all prime painted mechanical and electrical equipment and supports located in mechanical and electrical rooms and in all locations where Drawings call for paint or similar finish on walls and/or ceilings. Paint all mechanical equipment exposed on the roof. Exposed pipes shall be painted to Owner's Colour Coding/Piping schedule to suit use (i.e. hot water, etc.), included below.
- .14 Paint all gas piping, inside and out, whether exposed or concealed. Do not paint other pipe, conduit, ducts, insulation and the like where concealed above ceilings or in service shafts.
- .15 Make good paint finish on shop coated work where damaged.
- .16 Paint visible portions of steel shelf angles, lintels and structural steel.
- .17 Paint edges and all faces of metal doors.
- .18 Paint entirely, including all top and bottom edges, of all wood doors.
- .19 Interior of ducts and diffusers visible from exterior on room side.
- .20 Painting, as referred to herein shall include paint, enamel, stain, varnish and other finishes herein specified and normally applied to the various materials by the painting Subcontractor.

1.3 REFERENCE STANDARDS

- .1 Do painting and finishing work to material manufacturer's instructions and to the most recent edition of the Master Painters Institute (MPI) Maintenance Repainting Manual and Architectural Painting Specification Manual. The most stringent standards shall apply.

SECTION 09 92 00 - PAINTING & REPAINTING

- .2 All coatings must conform to Regulation SOR/2009-264, Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations, under the Canadian Environmental Protection Act, 1999, and the VOC limits set therein.

1.4 QUALITY ASSURANCE

- .1 The Painting Subcontractor must be a member in good standing of the Ontario Painting Contractors' Association.
- .2 Painting Subcontractor shall have a minimum of five (5) years documented successful experience with projects of a similar type and scope. When requested to do so by the Consultant, provide references confirming satisfactory performance of work on such projects.
- .3 Painting crew shall be composed of experienced, qualified journeypersons. Apprentices may undertake work only when fully supervised by senior, qualified workers.
- .4 All painting and coating products shall be as listed in the current Approved Product List published by the Master Painter's Institute (MPI).
- .5 Materials, surface preparation and workmanship shall conform to the latest edition of the MPI Maintenance Repainting Manual and Architectural Painting Specifications Manual.
- .6 The Painting Subcontractor shall inspect all surfaces requiring repainting and shall notify the Consultant and Contractor, in writing, of any defects or problems, prior to commencing repainting or after preparation work. Commencement of work will infer acceptance of existing conditions.
- .7 Where special coatings or decorating systems (i.e. textured coatings or non-MPI listed products or systems) are to be used in repainting, provide certification from the paint manufacturer of all surfaces and conditions for application of the specific paint or coating system. Arrange and pay for field inspection by the manufacturer and their approval of their paint or coating system application, at no additional cost to the Owner. Submit manufacturer's inspection reports and approvals to the Consultant.
- .8 Standard of Acceptance:
 - .1 For interior work, surfaces will be viewed using full final lighting in the space. For exterior work, surfaces will be viewed at time of peak sunlight exposure to the subject surface.
 - .2 Walls shall exhibit no defects when viewed from a distance of 1000 mm at a 90° angle.
 - .3 Ceilings and soffits shall exhibit no defects visible from grade at 45° angle to surface.
 - .4 Final coat shall be uniform in colour and sheen across the entire surface area.

1.5 WORK ENVIRONMENT

- .1 Do not apply paint finish in areas where dust is being generated. Apply paint only to dry, clean, properly cured and adequately prepared surfaces.

SECTION 09 92 00 - PAINTING & REPAINTING

- .2 Maintain environmental conditions within limits recommended by manufacturer, for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.
 - .1 Do not perform painting or decorating work when the ambient air and substrate temperatures are below 10°C, for both interior and exterior work.
 - .2 Maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.
 - .3 Provide adequate, continuous ventilation during work and for at least one week after completion of painting.
 - .4 Provide supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
 - .5 For exterior work, provide suitable weatherproof enclosure and sufficient heating facilities where required to provide suitable environmental conditions for painting.
 - .6 Do not perform painting or decorating work when the relative humidity is above 85% or when the dew point is less than 3°C variance between the air/surface temperature.
 - .7 Test concrete, masonry, plaster, and wood surfaces for moisture and alkalinity.
 - .1 Do not do painting or decorating work when the maximum moisture content of the substrate exceeds 15% for wood, or 12 % for concrete, masonry, plaster, and gypsum board.
- .3 Work areas shall be well illuminated during painting work. Do not perform work unless a minimum lighting level of 323 Lux (30 foot candles) is provided on surfaces to be painted or repainted.
- .4 Conform to requirements of MPI Maintenance Repainting Manual and Architectural Specification Manual.

1.6 INSPECTION AND ACCEPTANCE OF EXISTING CONDITIONS

- .1 Submit written confirmation of acceptance of existing conditions, to the Consultant, prior to commencing painting work. Painting may not commence without submission of this confirmation.
- .2 Receipt of this confirmation will be considered a prerequisite for certification of payment for this work.
- .3 Examine the conditions of existing surfaces to be repainted and evaluate with respect to MPI's Maintenance Repainting Manual. This includes the following:
 - .1 check thickness and adhesion of existing coatings. Perform adhesion tests on existing surfaces where existing coatings are peeling, flaking, or showing signs of delamination.
 - .2 determine what type of paint products were used previously
 - .3 assess defects in existing coatings

SECTION 09 92 00 - PAINTING & REPAINTING

- .4 Determine the degree of surface degradation. Refer to MPI guidelines for accessing levels of surface degradation.
- .4 Notify the Consultant, in writing, immediately if any existing condition is encountered that will prevent the attainment of satisfactory results in this work.
- .5 Existing paint materials used in the building may not be compatible with new materials specified for the surface types in some cases. This includes surfaces that may be coated with alkyd paints. Additionally, encapsulation of old lead paint may be required. Review hazardous materials report to determine if any lead based paint is known to be present in the building.

1.7 SUBMITTALS

- .1 Samples:
 - .1 Submit triplicate samples consisting of 300mm x 200mm panels of each type of paint finish specified.
 - .2 Panels shall be of same material as that on which sample coatings are to be applied in the field where possible.
 - .3 Identify each sample as to job, name of paint manufacturer, finish, colour, name and number, sheen and gloss units and name of Contractor.
 - .4 Retain one set of approved samples on site until completion of the Work.
- .2 Submit a list of all paint materials for review by Consultant, prior to ordering materials.
- .3 Submit manufacturer's data sheets for each paint product to be used on the project, including:
 - .1 MPI approved product number
 - .2 Product characteristics
 - .3 Surface preparation instructions and recommendations
 - .4 Primer requirements and finish specifications
 - .5 Storage and handling recommendations
 - .6 Application methods
 - .7 Cautions
 - .8 VOC data
- .4 Submit WHMIS Material Safety Data Sheets (MSDS) for all paint/coating materials.
- .5 Submit list of all paint brand names and colour formulas used on the job. This can be a sheet containing copies of the labels added to the paint containers at time of purchase.
- .6 Submit written confirmation of acceptance of existing conditions, as specified above, or an assessment of existing conditions noting all problematic areas.
- .7 When repainting occupied areas, submit work schedule for staging of work for the Consultant's review and Owner's approval, as noted above.
- .8 Submit a receipt for maintenance materials required to be provided to Owner; receipt to be signed by building Custodian.

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1.8 STORAGE AND HANDLING

- .1 Store paint and painter's materials in clean, dry, well ventilated locations approved by the Consultant. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- .2 All paint shall be in unopened containers, labelled with:
 - .1 manufacturer's name,
 - .2 product name, product type,
 - .3 instructions for surface preparation and product application,
 - .4 VOC content,
 - .5 compliance with applicable standards,
 - .6 batch date, and
 - .7 colour name and number.
- .3 Provide CO₂ fire extinguisher minimum 9 kg capacity in paint storage area.
- .4 Handle, store, use and dispose of flammable and combustible materials in accordance with the Ontario Fire Code and to requirements of Authorities Having Jurisdiction.
- .5 Do not permit contaminants to enter waterways, sanitary or storm drain systems, or into ground. Adhere to the following procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .6 Dispose of materials in accordance with the requirements of authorities having jurisdiction. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility. Empty paint cans are to be dry prior to disposal or recycling.

1.9 SIGNS

- .1 Provide legible signs throughout the Work reading "WET PAINT" in prominent positions during painting and while paint is drying.
- .2 Use 75mm high letters on white card or board.

1.10 TEMPORARY COVERS AND PROTECTION

- .1 Protect floors and other surfaces with temporary covers such as dust sheets, polyethelene film or tarpaulins. All to Consultant's approval.
- .2 Mask identification plates occurring on equipment, switch boxes, and fire rating labels, etc. which require painting.

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- .3 Protect, remove and replace hardware, accessories, lighting fixtures, and similar items as required except primed for paint door closers which shall be painted. Light switches and electrical communication outlet plates to be removed and reinstalled on completion of paint application.
- .4 Keep oily rags, waste and other similar combustible materials in closed metal containers; take every precaution to avoid spontaneous combustion, remove waste and combustible materials daily.
- .5 Clean surfaces soiled by spillage of paint, paint spattering and the like. If such cleaning operations damage the surface, repair and replace damaged work at no cost to the Owner.

1.11 RETOUCHING

- .1 Do all retouching, etc. to ensure that the building may be handed over to the Owner in perfect condition, free of spatter, finger prints, rust, watermarks, scratches, blemishes of other disfiguration.
- .2 After fully decorating and retouching a room or other area, notify Consultant. After inspection and final approval by Consultant post sign 'DECORATING COMPLETE - NO ADMITTANCE WITHOUT PERMISSION'.

1.12 TEST AREA

- .1 A room or area in the building will be designated by the Consultant as a test area to establish standard of workmanship, texture, gloss and coverage.
- .2 Prior to any painting being started, request a meeting on Site between Consultant, Contractor, and Subcontractor to review conditions, surfaces, anticipated problems and to clarify quality of workmanship acceptable to Consultant.
- .3 Apply finishes to each type of surface within room with correct material, coats, colour, texture and degree of gloss in sample area and have same approved prior to providing Work of this Section.
- .4 Retain test area until after completion of Work. Test area to be minimum standard for the Work.
- .5 Failure to comply with the above will be cause for Consultant to request all Work previously painted to be repainted.

1.13 MAINTENANCE MATERIALS

- .1 Provide one sealed can, one litre capacity, of each product in each colour used in the Work for Owner's use in maintenance Work.
- .2 Container to be new fully labelled with manufacturer's name, type of paint, and colour.

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- .3 Store materials where directed by Owner's representative on site. Obtain receipt, signed by building custodian and listing all maintenance materials provided, and submit to Consultant.

1.14 WARRANTY/GUARANTEE

- .1 Furnish a 100% Maintenance Bond, valid for **two (2) years** from date of Substantial Performance, or from date of completion of Work if work is not complete at date of Substantial Performance.
- .2 Subcontractor's Maintenance Bond, shall warrant that the work has been performed in accordance with the standards and requirements of the MPI Maintenance Repainting Manual and Architectural Painting Specification Manual, most recent editions.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Paint and finishing materials shall be the highest grade, first line quality, low VOC products, included on the MPI Approved Product List under the MPI reference numbers specified herein, and the products of the following manufacturers:
 - .1 Benjamin Moore & Co.
 - .2 Devoe High Performance Coatings
 - .3 Dulux Paints
 - .4 The Sherwin-Williams Company
 - .5 General Paints
 - .6 Sico Paints
 - .7 PPG Canada
 - .8 Para Paints
- .2 Paints, enamels, fillers, primers, varnishes and stains shall be ready mixed products of one of the manufacturers listed. Substitutes will not be allowed. The only exception to this is where a specific product of another manufacturer is specified herein; such products shall be provided as specified. Paint products shall have minimum 40% volume solids.
- .3 All paints shall be ready-mixed and pre-tinted. Thoroughly re-mix all paint in containers prior to and during application to ensure break-up of lumps and uniformity of colour and gloss.
- .4 Thinners, cleaners - type and brand recommended by the paint manufacturer
- .5 Only products manufactured by paint manufacturer stated at time of submission of samples will be allowed on Site unless other materials specifically specified herein or otherwise approved. No painting to be performed until paint manufacturer is identified and acceptance received from the Consultant.
- .6 Where available, paint products shall meet MPI Environmentally Friendly E3 ratings for VOC content.
- .7 All materials and paints shall be free of lead and mercury, shall conform to Canadian Regulations for VOC limits, and shall meet flame spread and smoke developed limits required by code.

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- .8 Deliver materials to Site in original unbroken containers bearing brand and maker's name. The presence of any unauthorized material or containers for such, on Site shall be of sufficient cause for rejection of ALL paint materials on Site at that time, and all previous painted work repainted with proper material.

2.2 **COLOUR SCHEDULE**

- .1 Consultant will provide detailed colour schedule at a later date. Conform to schedule including patterns, colours, and locations for all finishes.
- .2 In each room, the Consultant may select one wall where an accent colour may be applied.
- .3 Refer to room finishing notes for detailed instructions.

PART 3 - EXECUTION

3.1 **PREPARATION - GENERAL**

- .1 Remove existing hardware and surface fittings, fastenings, plates, mechanical louvers, door and window hardware removable rating / hazard / instruction labels, washroom accessories, light fixture trim, signage, etc., from walls, ceilings, doors and frames, prior to repainting and replace upon completion. Clean all items, wrap carefully, fully labelling each package, and store on site for reinstallation at completion of the work. Do not use solvent or reactive cleaning agents on items which may mar or lose finishes.
- .2 Protect all adjacent interior surfaces, equipment, and furnishings to remain in work areas, including rating and instruction labels on doors, frames, piping, etc., from repainting operations and damage by use of drop cloths, shields, masking, templates, or other suitable methods. Make good any damage caused by failure to provide adequate protection.

3.2 **PREPARATION OF SURFACES**

- .1 Prepare surfaces in accordance with the following standards and to MPI Maintenance Repainting Manual and Architectural Specification Manual; the most stringent requirements shall apply.
- .2 Existing Surfaces:
 - .1 Refer to the MPI Maintenance Repainting manual for the levels of surface degradation and the corresponding surface preparation requirements and recommended repaint systems. Prepare existing surfaces as recommended for the finish required.
 - .2 Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mould, mildew, mortar, efflorescence, smoke stains, sap, and sealers from existing surfaces to assure sound bonding to tightly adhering old paint.
 - .3 Scape peeling paint off existing masonry surfaces and apply a compatible masonry sealer, approved for use by the paint manufacturer, before applying new coatings.

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- .4 Glossy surfaces must be clean and dull before repainting. Wash with abrasive cleanser, or, wash thoroughly and dull by sanding. Use full coat of bonding primer below finish coats.
- .5 Where smoke and water stains cannot be adequately removed by cleaning, provide stain blocking primer over affected areas.
- .6 Spot prime any existing bare areas with an appropriate primer.
- .3 New Surfaces:
 - .1 Prepare wood surfaces to CGSB 85-GP-IM. Use CAN/CGSB 1.126 vinyl sealer over knots and resinous areas. Use CGSB 1-GP -103M wood paste filler for nail holes. Tint filler to match.
 - .2 Touch up damaged spots of shop paint primer on steel with CAN/CGSB 1.40M to CGSB 85-GP-14M.
 - .3 Prepare galvanized steel and zinc coated surfaces to CGSB 85-GP-16M. This includes wiped coated steel surfaces.
 - .4 Prepare masonry and concrete surfaces to CGSB 85-GP-31M.
 - .5 Test coat concrete surfaces to ensure adhesion of primer prior to proceeding with painting. If concrete contains fly ash, a solvent based primer will be required.
 - .6 Prepare wallboard surfaces to CGSB 85-GP-33M. Fill minor cracks with plaster patching compound for stained woodwork.
 - .7 Prepare concrete floors to CGSB 85-GP-32M.
 - .8 Prepare copper piping and accessories to CGSB 85-GP-20M.
 - .9 Apply prime coat on wood scheduled for paint finish before installation.
 - .10 Back prime wood scheduled for transparent finish. Do not prime surfaces scheduled for transparent finish.
- .4 Coat test areas to confirm adhesion of all coatings over pipe insulations and plastics prior to proceeding with painting.
- .5 NOTE: ABOVE NOTED SURFACES MAY NOT ALL BE APPLICABLE TO THIS PROJECT.

3.3 RECOATABILITY TESTING

- .1 Perform a minimum of ten (10) recoatability tests at existing surfaces to be repainted as outlined below. Testing of interior surfaces must be performed in the presence of the Consultant.

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- .2 Check for compatibility between existing and new coatings by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet. Allow surface to dry one week before testing adhesion per ASTM D3359. If the coating system is incompatible, complete removal is required.
- .3 Clean and prepare test areas of the surface to be repainted. Areas selected shall be areas of the surfaces most vulnerable to weathering and/or wearing.
- .4 Repeat the recoatability testing until satisfactory results are obtained.

3.4 FINISHING SYSTEMS

- .1 Finishing systems specified below are based on the repainting and new painting systems included in the MPI manuals. Painting in renovated areas consists of repainting of existing surfaces and painting of new surfaces.
 - .1 RIN and REX formulas are found in the Maintenance Repainting Manual and apply to repainting work.
 - .2 INT and EXT formulas are found in the Architectural Painting Specification Manual and apply to new painting work.
 - .3 Finishing systems are to be modified where indicated below.
 - .4 Finishes must be low VOC products; use paint products meeting MPI Environmentally Friendly E3 ratings, where such products are available in Ontario.
 - .5 All finishing systems shall be Premium Grade.
- .2 Existing surfaces to be repainted are to be primed in accordance with MPI Maintenance Repainting Manual recommendations for the degree of surface degradation, as follows:
 - .1 DSD-1: Touch-up
 - .2 DSD-2: Spot prime
 - .3 DSD-3: Full prime coat
 - .4 DSD-4: After repair by others, full prime coat
- .3 Bonding Primer:
 - .1 Where existing surfaces are coated with different coating types than they are specified to receive, including old alkyd paints, glazed coatings, epoxies, etc., or where surfaces are inherently slick or glossy, use a full prime coat of bonding primer before applying new finish coats.
 - .2 All existing metal doors, frames and screens are to receive a full coat of bonding primer before repainting.
 - .3 Bonding primer shall be MPI #17 X-Green, or MPI #17 within VOC range E3, selected as appropriate for the substrate and new coating.

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.4 Interior Work:

.1 Drywall and Plaster:

.1 Walls: High Performance Architectural Latex, semi-gloss finish

.1 RIN 9.2B - G5, for repainting work:

- .1 Bonding primer: MPI #17 X-Green
- .2 Where bonding primer is not required, prime as required by DSD level
- .3 2 coats HIPAC Latex; MPI #141, VOC Range E3

.2 INT 9.2B - G5, for new painting work:

- .1 1 coat Latex Primer Sealer; MPI #50, VOC Range E3
- .2 2 coats HIPAC Latex; MPI #141, VOC Range E3

.2 Ceilings: Latex (over latex sealer), flat finish

.1 RIN 9.2A - G1, for repainting work:

- .1 Bonding primer: MPI #17 X-Green
- .2 Where bonding primer is not required, prime as required by DSD level
- .3 2 coats MPI #53; VOC Range E3

.2 INT 9.2A - G1 for new painting work:

- .1 1 coat Primer; MPI #50
- .2 2 coats MPI #53; VOC Range E3

.3 All new drywall, whether requiring finish painting or not, must receive prime coat.

.2 Concrete Block, paint: High Performance Architectural Latex, semi-gloss finish

.1 RIN 4.2D - G5 (modified) for repainting work

- .1 1 coat bonding primer; MPI #17 X-Green
- .2 Where bonding primer is not required, prime as required by DSD level
- .3 2 coats finish; MPI #141, VOC Range E3

.2 INT 4.2D - G5 (modified) - 4 coat system, for new painting work

- .1 2 coats latex blockfiller; MPI #4
- .2 2 coats finish; MPI #141, VOC Range E3

.3 Concrete Block, glaze: Epoxy-modified Latex Finish, gloss

.1 RIN 4.2F - G6 (modified) for repainting work

- .1 1 coat bonding primer; MPI #17 X-Green
- .2 2 Coats epoxy-modified latex finish; MPI #115

.2 INT 4.2J - G6 (modified) - 4 coat system, for new painting work

- .1 2 coats latex blockfiller; MPI #4
- .2 2 Coats epoxy-modified latex finish; MPI #115

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- .3 Provide in all hallways and washrooms, and where noted as "glazed" in Room Finish Schedule.
- .4 Concrete Block, wet areas: Epoxy, Gloss; "Tile like" Finish
 - .1 RIN 4.2D for repainting work
 - .1 1 coat bonding primer; MPI #17, VOC Range E3
 - .2 2 Coats epoxy finish; MPI #77, VOC \leq 250 g/L
 - .2 INT 4.2G (modified) 4 coat system for new painting work
 - .1 2 coats epoxy blockfiller; MPI #116, VOC Range E3
 - .2 2 Coats epoxy finish; MPI #77, VOC \leq 250 g/L
 - .3 Provide in all wet areas, including washrooms.
- .5 Cast in Place Concrete
 - .1 walls: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 3.1J - G5 for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level
 - .3 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .2 INT 3.1C - G5 for new painting work
 - .1 1 coat alkali resistant primer; MPI #3
 - .2 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .2 ceilings: High Performance Architectural Latex, low sheen finish
 - .1 RIN 3.1J - G2 for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level
 - .3 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .2 INT 3.1C - G2 for new painting work
 - .1 1 coat alkali resistant primer; MPI #3
 - .2 2 coats HIPAC Latex finish; MPI #141, VOC Range E3
 - .3 For concrete mixes containing fly ash, primer shall be alkali resistant solvent based primer MPI #223 or, on cured concrete, solvent based bonding primer MPI #69. Confirm suitability of primer for substrate, with product manufacturer.

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- .6 Woodwork - Opaque Finish: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 6.3T for repainting work
 - .1 prime as required by DSD level; MPI #39
 - .2 2 coats HIPAC latex finish; MPI #141. VOC Range E3
 - .2 INT 6.4S for new painting work
 - .1 1 coat latex primer MPI #39
 - .2 2 coats HIPAC latex finish; MPI #141. VOC Range E3
- .7 Woodwork - Polyurethane Varnish over Semi-transparent Stain, gloss
 - .1 RIN 6.3E - G6 for repainting work
 - .1 stain as required by DSD level; MPI #90
 - .2 2 coats Polyurethane Varnish, clear gloss; MPI #56
 - .2 INT 6.3E - G6 for new painting work
 - .1 Wood Stain; MPI #90
 - .2 3 coats Polyurethane Varnish, clear gloss; MPI #56
- .8 Ferrous Metal: W.B. Light Industrial Coating, semi-gloss finish
 - .1 RIN 5.1P- G5 for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #101
 - .3 2 coats W.B. light industrial coating; MPI #153
 - .2 INT 5.1N - G5 for new painting work
 - .1 1 coat epoxy primer; MPI #101
 - .2 2 coats W.B. light industrial coating; MPI #153
- .9 Shop Primed Structural Steel and Metal Fabrications (New work):
 - .1 Confirm type of shop primer used with structural steel supplier, and use compatible system listed below.
 - .2 Confirm compatibility of all coatings with manufacturers.
 - .3 Touch up prime coat where damaged, with compatible primer.
 - .4 Over Q.D. metal primer: High Performance Architectural Latex, semi-gloss finish
 - .1 INT 5.1R - G5, for new painting work
 - .1 1 coat Alkyd metal primer MPI #79; VOC Range E2 or E3
 - .2 2 coats HIPAC Latex; MPI #141; VOC Range E3
 - .5 Over epoxy primer: W.B. Light Industrial Coating, semi-gloss finish
 - .1 INT 5.1N - G5, for new painting work
 - .1 1 coat epoxy primer; MPI #101
 - .2 2 coats W.B. light industrial coating #153

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- .10 Galvanized Metal: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 5.3J - G5 (over anti-corrosive alkyd primer)for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #134
 - .3 2 coats HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 5.3M for new painting work
 - .1 1 coat water based Galvanized Primer MPI #134
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
- .11 Hollow Metal Doors, Frames, and Screens: High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 5.3J - G5 (modified) for repainting work
 - .1 1 coat of bonding primer MPI #17 X-Green
 - .2 2 coats of HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 5.3M - G5 for new painting work
 - .1 1 coat water based Galvanized Primer MPI #134
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
- .12 Insulation on Pipes & Ducts (plastic): High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 6.8A - G5, for repainting work
 - .1 1 coat Bonding Primer MPI #17 X-Green
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 6.8A - G5, for new painting work
 - .1 1 coat Bonding Primer MPI #17 X-Green
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3
- .13 Mechanical Equipment:
 - .1 High Performance Architectural Latex, semi-gloss finish
 - .2 As specified for metal types.
 - .3 Use heat resistant paint where required.
- .14 Piping, Conduit & Ductwork (uncoated): High Performance Architectural Latex, semi-gloss finish
 - .1 RIN 5.3J - G5, for repainting work
 - .1 1 coat of bonding primer MPI #17 X-Green
 - .2 2 coats of HIPAC Latex MPI #141; VOC Range E3
 - .2 INT 5.3M - G5, for new painting work
 - .1 1 coat water based Galvanized Primer MPI #134
 - .2 2 coats HIPAC Latex MPI #141; VOC Range E3

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- .15 Surfaces behind grilles, within 30mm of grille: Institutional Low Odour/ Low VOC, flat finish
 - .1 RIN 5.3K - G1, for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #134
 - .3 2 Coats Acrylic Flat, Black; MPI #143
 - .2 INT 5.3N - G1, for new painting work
 - .1 1 coat galvanized Primer MPI #134
 - .2 2 Coats Acrylic Flat, Black; MPI #143
- .16 Concrete Floors: Alkyd Floor Enamel, gloss
 - .1 RIN 3.2B for repainting work
 - .1 Bonding primer: MPI #17 X-Green
 - .2 Where bonding primer is not required, prime as required by DSD level; MPI #27
 - .3 2 Coats Alkyd Floor Enamel, MPI #27
 - .2 INT 3.2B for new surfaces
 - .1 3 Coats Alkyd Floor Enamel, MPI #27
- .17 Thermoplastic Rubber Wall Base: High Performance Architectural Latex, semi-gloss finish
 - .1 INT 6.8A - G5
 - .1 1 coat s.b. bonding primer MPI #69
 - .2 2 coats HIPAC Latex MPI #141
- .5 Exterior Work
 - .1 Stucco, cementitious panels: High Performance Architectural Latex (over W.B. alkali-resistant primer), low sheen
 - .1 REX 9.1 K -G3, for repainting work
 - .1 Prime as required by DSD level; Alkali Resistant Acrylic Primer MPI #3
 - .2 2 Coats Latex MPI #315
 - .2 New stucco: not painted (integral colour); refer to Section 09 29 00
 - .2 Galvanized Steel: W.B Light Industrial Coating (over cementitious primer), semi-gloss
 - .1 REX 5.3G for repainting work
 - .1 Over non-compatible coatings, 1 full coat bonding primer
 - .2 or, over compatible epoxy coatings, prime as required by DSD level; MPI #101
 - .3 2 Coats Exterior W.B Light Industrial Coating MPI #163
 - .2 EXT 5.3G for new painting work
 - .1 Touch-up welds and any repairs
 - .2 1 coat Cementitious Primer MPI #26
 - .3 2 Coats Exterior W.B Light Industrial Coating MPI #163

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- .3 Ferrous Metals, Structural Steel: W.B. Light Industrial Coating over rust inhibitive primer, semi gloss
 - .1 REX 5.1K - G5, for repainting work
 - .1 Over non-compatible coatings, 1 full coat bonding primer
 - .2 or, over compatible coatings, prime as required by DSD level; MPI #107
 - .3 2 Coats Water Based Light Industrial Coating MPI #163
 - .2 EXT 5.1M - G5, for new painting work
 - .1 1 coat Rust Inhibitive Primer MPI #107
 - .2 2 Coats Water Based Light Industrial Coating MPI #163
- .4 NOTE: Touch up shop primer and field welds using zinc rich primer.
- .5 Wood: Solid Colour Stain
 - .1 REX 6.2D for repainting
 - .1 Over non-compatible coatings, 1 full coat bonding primer
 - .2 or, over compatible coatings, prime as required by DSD level; MPI #5
 - .3 2 Coats Exterior Solid Colour Stain MPI #14
 - .2 EXT 6.2D for new painting work
 - .1 1 Coat Exterior Alkyd Primer MPI #5
 - .2 2 Coats Exterior Solid Colour Stain MPI #14
- .6 For painted markings on asphalt paving refer to Section 32 17 23.

3.5 APPLICATION

- .1 Apply coatings in accordance with manufacturer's printed instructions.
- .2 Use suitable, clean equipment in good condition.
- .3 Maintain dust-free suitable conditions on the surfaces free from machine, tool or sandpaper marks, insects, grease, or any other condition liable to impair finished work to prevent production or good results.
- .4 Do not commence repainting unless substrates are acceptable and until all environmental conditions (heating, ventilation, lighting and completion of other subtrade work, if applicable) are acceptable for application of products.
- .5 Allow appropriate time between surface cleaning and commencement of painting work to permit surface conditions to be ready for coating work, and to prevent re-contamination of surfaces.
- .6 Apply primers, paints, and stains in accordance with the Premium Grade finish requirements of the MPI Painting and Repainting manuals.
- .7 Apply bonding primer over incompatible existing coatings and glossy substrates, as specified above.

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- .8 Number of coats specified is to be considered a minimum. Where deep or bright colours are required, apply a minimum of four coats and as required to achieve satisfactory results. This will include at accent walls in kindergarten classrooms and child care rooms.
- .9 Apply evenly, uniform in sheen, colour and texture, free from brush or roller marks, well brushed or rolled in and free of crawls, runs, join marks or other defects.
- .10 Sand and dust between each coat to provide an anchor for next coat and to remove defects in previous coat (runs, sags, etc.) visible from a distance up to 1000 mm.
- .11 Permit paint to dry between coats. Touch up uneven spots after applying first coat. Tint various coats of multiple coat work in light shades of the final colour selected, to distinguish between coats.
- .12 To avoid air entrapment in applied coats, apply materials in strict accordance with manufacturer's spread rates and application requirements.
- .13 Give Consultant due notice and sufficient opportunity (minimum 48 hours) to inspect each coat. Do not proceed with subsequent coat until preceding coat approved. Consultant reserves the right to order complete retreatment if this condition is not observed.
- .14 At concrete block, two coats of block filler are required to achieve smooth and uniform surface on block.
- .15 Painting coats are intended to cover surfaces perfectly; if in painter's opinion, formula specified is inadequate to provide a first class finished surface, report to the Consultant and have formulas rectified before commencing work. Surfaces imperfectly covered shall receive additional coats at no additional cost. Provide additional coat where ever dark colours are used.
- .16 Use paint unadulterated. Use same brand of paint for primer, intermediate and finish coats. Factory mix all paints.
- .17 Paint finish shall be applied by roller except in the case of wood trim, door frames, base board and similar work of small surface area which shall be painted by brush. Do not use roller for applying finish other than paint.
- .18 Spray painting will not be permitted unless specifically approved in writing by the Consultant in each instance. Consultant may withdraw approval at any time and prohibit spray painting for reasons such as carelessness, poor masking or protection measures, drifting paint fog, disturbance to other Trades, or failure to obtain a dense, even, opaque finish. Spray painting shall be full double coat, i.e. at least two passes for each coat. Do not use spray or roller on wood or metal surfaces, brush only unless approved in writing by Consultant.
- .19 Paint entire surfaces, including areas where millwork or other items are to be installed.
- .20 Finish edges of doors with paint or stain treatment as required to match face of door. Seal hidden edges of wood doors with one coat of shellac and one coat gloss varnish or two coats paint. Repaint tops and edges of wood doors after fitting.

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- .21 Even up stained woodwork in colour as required by nature of wood and as directed by Consultant. Apply same finish on trim, fitments cupboards and other protecting ledges as on surrounding work, disregard sight lines.
- .22 Carefully hand smooth and sandpaper wood between coats (including priming). Apply one coat sealer before applying first coat paint filler to knots or sap blemishes on wood surfaces to receive paint or stain finish.
- .23 After first coat, fill nail holes, splits and scratches, using putty coloured to match finish.
- .24 Remove rust, oil, grease and loose shop paint from metal work by brushing or with wire brushes and make good shop coat before proceeding with final finish. Feather out edges to make touch up patches inconspicuous.
- .25 Clean castings with wire brush before application of first paint coat.
- .26 Do not etch galvanized metal. Use zinc rich primer. This includes metal door frames and the like with wiped zinc coating.
- .27 Note that bonding primer is required on all existing hollow metal doors, frames and screens to be repainted. A full coat of primer is required on all new hollow metal doors, frames and screens. Three coat system is required in all cases. Sand between all coats.
- .28 Remove form oil or parting compounds from concrete surfaces. Use Xylol or approved compound.
- .29 Paint interior of pipe spaces, ducts, etc. visible through grilles or through linear metal ceilings in black matt finish.
- .30 Conform with Consultant's colour schedule and exactly match approved samples.
- .31 Mechanical and Electrical Pipes, Ducts and Conduits:
 - .1 Commence Work when new piping installation is complete in the area concerned.
 - .2 Unless otherwise noted, repainting shall also include exposed to view / previously painted mechanical and electrical equipment and components (panels, conduits, piping, hangers, ductwork, etc.). Leave unfinished exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish.
 - .3 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour, and sheen finish to match existing unless otherwise noted or scheduled.
 - .4 Do not paint plated or other prefinished surfaces, unless otherwise noted.
 - .5 Do not paint over name plates or instruction labels.
 - .6 Keep repainted sprinkler heads free of paint.

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- .7 Paint conduit in same colour as background paint.
- .8 Apply formulae specified even with new items surface prime painted at shop prior to delivery. Touch up shop priming where damaged.
- .9 Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65 degrees C.
- .10 Paint exposed pipes and ducts and their supports and related items in colours to suit colour coding included below; confirm with Consultant. Refer to Mechanical Division 23 for further instructions.
- .32 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- .33 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

3.6 COLOUR CODING OF PIPING

- .1 The following is a general list of typical painting requirements for piping. All repainting of piping shall match colours and pattern of existing. Painting of new piping shall match colours and patterns of existing piping of same type. Confirm colours and patterns with Owner.

FUNCTION	COLOUR	WHERE EXPOSED	WHERE CONCEALED	DIRECTION INDICATION
Natural Gas	Yellow	Solid	Solid	-
Stand Pipe System	Red	Solid	Solid	-
Heating Water Supply	Dark Green	Solid	300mm Band Every 6m	At minimum of every 6m, Direction Arrow 250mm Long, 25mm wide
Heating Water Return	Pale Green	Solid	300mm Band Every 6m	
Chilled Water Supply	Orange	Solid	Solid	
Chilled Water Return	Orange	Solid	Solid	
Cooling Water To Tower	Buff	Solid	Solid	
Cooling Water From Tower	Buff	Solid	Solid	
Domestic Hot Water	Dark Blue	Solid	300mm Band Every 6m	At minimum of every 6m, Direction Arrow 250mm Long, 25mm wide
Domestic Cold Water	Pale Blue	Solid	300mm Band Every 6m	

3.7 CLEAN-UP AND PROTECTION

- .1 Replace and reinstall all items previously removed and stored upon completion of repainting work in each area.
- .2 Protect all newly painted exterior surfaces from rain and snow, condensation, contamination, dust, salt spray and freezing temperatures until paint coatings are completely dry. Curing periods shall exceed the manufacturer's recommended minimum time requirements.
- .3 Erect barriers or screens and post signs to warn, limit or direct traffic away or around work area as required.
- .4 Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .5 Clean equipment and dispose of wash water and solvents as well as all other cleaning and protective materials, paints, thinners, paint removers/strippers in accordance with the environmental and safety requirements of authorities having jurisdiction.

3.8 REPAIRS

- .1 Cracks occurring in walls or ceilings requiring patching during the Warranty Period shall be repainted in such a way that the patch is not visible at a distance of 1m.
- .2 If patch painting is not acceptable, repaint entire wall, or ceiling.

END OF SECTION