**KAWARTHA PINE RIDGE**
**DISTRICT SCHOOL BOARD**

# COURTICE SECONDARY SCHOOL CAFETERIA WING
# SIPOREX ROOF DECK REPLACEMENT
# 1717 NASH ROAD,
# COURTICE, ONTARIO

"ISSUED FOR PERMIT & TENDER"

**Project No. 24192**

**DATE** DECEMBER 2024


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# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Work Covered by Contract Documents

.1 Work of this Contract comprises the **Roof and Siporex Deck Replacement of roof area A,B, C D and E. Work is inclusive of all mechanical replacements and interior finish improvements necessary to support the decking replacement project.**

For; The Kawartha Pine Ridge District School Board, and as indicated on the drawings and specifications.

CONSTRUCTION PHASING
PHASE 1:
Existing roof removal. Only remove roof to the extent that can be made watertight by end of day.

PHASE 2:
Siporex removal and installation of new steel deck, densdeck and vapour barrier on the area.

PHASE 3:
Installation of new assembly on the entire roof

## 1.3 Location of Site

1. The Work of this Contract is located at 1717 Nash Road, Courtice within the Kawartha Pine Ridge District School Board.

1.4 Imperial Project

.1 This project is to be based on The Imperial System of Units. Measurements are expressed in imperial units.

.2 All dimensions are to be shown in imperial.

1.5 Site Access

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

.2 Provide secure construction fencing and/or temporary hoarding as specified and where indicated.

1.6 Contractor Traffic Route

.1 Maintain fire department access/control.

1.7 Work Sequence

.1 Construct Work as phased and as noted on drawing notes. Work to proceed in a continuous manner.

1.8 Contractors Use of Premises

.1 Contractor has restricted use of work area during times specified until Substantial Performance.

1.9 References and Codes

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

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

1.10 Engineer Design

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

1.11 Hazardous Material Discovery

.1 Hazardous material is presumed to be inherent in the ceiling systems effected by the work for roof area D-a. Review attached Hazardous materials report in appendix “A” for abatement details Should hazardous materials be encountered which are not identified in the referenced reports, stop work and contact the Owner and Consultant immediately. Refer to Section 01 41 00.

1.12 .Building Smoking Environment

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

1.13 Special Conditions

.1 The following general and special conditions apply:
- .1 All existing surfaces and finishes are to be repaired wherever damaged during the course of the Work.
- .2 No crane operations are allowed during school hours and above occupied space.
- .3 Crane lifting shall take place after hours, or when the building is unoccupied.
- .4 No torching is allowed on KPRDSB property.
- .5 Contractor to review exterior and interior of the building prior to start and after completion of the project and provide reports about pre-existing condition and any cause damage on the property.
- .6 Contractor to inform Owner and stakeholders daily via email about the location of their work, and to notify which classrooms and/or indoor space may be affected for that day.
- .7 Contractor to coordinate with the Owner a full or partial closure of classrooms/indoor.
- .8 Contractor is responsible for installation of the overhead protection when working above the entrance and assembling of temporary ground fence when working along roof edge.
- .9 Contractor shall install 6-mil polyethylene sheeting on the interior side of the windows, fresh air intakes and louvers in the vicinity of ground setup or close to working areas (plus additional radius of 20’), in order to mitigate odours, dust and minimize disruption for the occupants.
- .10 Contractor shall install self-adhered tape and seal all gaps along perimeter, around curbs and other penetrations on the deck level prior to adhesive/asphalt application, so to mitigate the leaks and potential debris getting in the interior

space. Contractor to ensure that roof assembly is watertight at the end of each workday. Any interior damage caused by negligence shall be promptly repaired by the Contractor at no additional cost to the KPRDSB.

.11 Contractor to provide a revised emergency egress plan for review by Consultant/Owner if the original evacuation plan is altered or effected during the project.

.12 Contractor to inform Consultant/ Owner if any mechanical and electrical equipment on roof was found inoperable/obsolete before commencing the project.

.13 Any deck deflection, pooling areas, or other unforeseen issues discovered during roof removal and installation must be promptly reported to the consultant.

.14 Contractor is responsible for taking daily progress photos and submitting them with the site reports upon request.

.15 Contractor is required to conduct water test following the installation of each retrofit drain and to prepare site report. Any issues discovered are to be reported to the consultant.

1.14 Protection of Drawings

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

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

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

1.15 “By Others”

.1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope

PART 2 PRODUCTS

3.1 Not Used

.1 Not used

PART 3 EXECUTION

3.2 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

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

## 1.3 Request for Information (RFI)

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

## 1.4 Submittal Procedures

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

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

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

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

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

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

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

1.5 Screening of RFI's

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

1.6 Response to RFI's

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

1.7 Response Timing

.1 Allow 2 Working Days for review of each RFI by the Consultant.

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

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

.4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 2 Working Days, the Consultant will confer with the Contractor within 2 Working Days of receipt of such RFI's, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority among the RFI's submitted. The

Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Preconstruction Conference

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

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

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

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

## 1.3 Project Meetings

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

.2 Project meetings shall be held bi-weekly.

.3 Meeting minutes shall be distributed to all parties within three days of the meeting.

.4 Attendees at project meetings shall include at a minimum; Owner, Consultant, Contractor Project Manager, and Site Superintendent and major subcontractors.

1.4 Safety Meetings

.1 Conduct monthly contractor safety committee meetings.

.2 Conduct weekly toolbox talks.

1.5 On-Site Documents

.1 Maintain at job site, one copy each of the following:
- .1 Contract drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed shop drawings.
- .5 Requests for Information (RFI's)
- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Copy of approved Work schedule.
- .10 Manufacturers' installation and application instructions.
- .11 Health and Safety Plan and Other Safety Related Documents.
- .12 Other documents as specified.

1.6 Schedules

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

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

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

1.7 Requests for Information (RFI's)

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

1.8 Closeout Procedures

.1 Notify Consultant when Work is considered ready for Substantial Performance.
.2 Accompany Consultant on preliminary inspection to determine items listed for completion or correction.

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

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

1.9 Cost Breakdown

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Related Sections

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

## 1.3 Submittals

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

## 1.4 Schedules Required

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

## 1.5 Format

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

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

.3 Split horizontally for projected and actual performance.

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

.5 Format for listings: chronological order of start of each item of work.
.6 Identification of listings: By Systems description.

## 1.6 Submission

.1 Submit initial format of schedules within 10 working days after award of Contract.

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

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

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

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

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

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

## 1.7 Critical Path Scheduling

.1 Include complete sequence of construction activities.

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

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

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

.5 All schedules shall be developed utilizing industry standard 'best practices' including, but not limited to:
- .1 No open-ended activities.

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

.6 Include dates for commencement and completion of each major element of construction as follows.
.1 Site clearing.
.2 Site utilities.
.3 Foundation Work.
.4 Structural framing.
.5 Special Subcontractor Work.
.6 Equipment Installations.
.7 Finishes.

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

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

.9 Show changes occurring since previous submission of schedule:
.1 Major changes in scope.
.2 Activities modified since previous submission.
.3 Revised projections of progress and completion.
.4 Other identifiable changes.

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

1.8 Submittals Schedule

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

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

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

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

## 1.3 Administrative

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

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

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

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

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

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

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

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

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

## 1.4 Requests for Information (RFI’s)

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

1.5 Shop Drawings and Product Data

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

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

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

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

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

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

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

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

.9 Submissions shall include:
  .1 Date and revision dates.
  .2 Project title and number.

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

.10 After Consultant's review, distribute copies.

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

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

.13 Delete information not applicable to project.

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

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

.16 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
  .1 This review shall not mean that the Consultant approves detail design inherent

in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.6 Progress Photographs

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

1.7 Samples

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

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

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

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

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

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

1.8 Mock-Ups

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

1.9 Certificates and Transcripts

.1 Submit Workers' Compensation Board status.

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Related Sections

.1 Section 01 70 03 Safety Requirements

## 1.3 References

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

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

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

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

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

## 1.4 Owner's Regulations

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

1.5 Standards and Definitions

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

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

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

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

1.6 Designated Substances

.1 Designated Substance Report is to be provided by Kawartha Pine Ridge District School Board to identify known designated substances.

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

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

1.7 Hazardous Materials

.1 Definition: "Hazardous Material" is material, in any form, which by its nature, may be flammable, explosive, irritating, corrosive, poisonous, or may react violently

with other materials, if used, handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.

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

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

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

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

1.8 Spills Reporting

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

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

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

1.9 Protection of Water Quality

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

.2 Provide all de-watering and sedimentation control required to properly complete

the work of this contract.

1.10 Access for Inspection and Testing

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

1.11 Other Regulatory Requirements

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

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

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

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Inspection

.1 Contractor is responsible for Quality Control (QC).

.2 Allow Owner and Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.

.4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.5 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

## 1.3 Access to Work

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

## 1.4 Procedures

.1 Notify Owner and Consultant 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples

1.5 Rejected Work

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

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

1.6 Reports

.1 Submit electronic pdf format inspection and test reports to Consultant.

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

1.7 Contractors Responsibilities

.1 Contractor is responsible for the execution of the Construction Quality Plan and is to pay all costs for the execution of the Construction Quality Plan. Designate an experienced site representative for carrying out the Construction Quality Plan.

1.8 Tests

.1 Furnish test results as requested.

.2 Furnish two tests for air quality. One on the first day and before the construction starts, and another air quality test on the first day when construction starts, and/or the bitumen kettle is being used

.3 Cost of tests beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Consultant and may be authorized as recoverable.

1.9 Equipment and Systems

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 References

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

## 1.3 Installation and Removal

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

.2 Remove from site all such work after use.

## 1.4 Hoisting

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

.2 Hoists and cranes shall be operated by qualified operator. There shall be NO CRANE LIFTING during school operational hours and above occupied space. Crane lifting shall take place after hours or when the building is unoccupied

## 1.1 Site Storage/Loading

.1 Confine the work and the operations of employees to limits described by the Owner’s representative.

.2 There is limited space available on site(s) for material storage and lay-down areas. Hoisting of materials will be required from remote parking areas and driveways. Secure exercise yards may not be used under any circumstances.

.3 Do not unreasonably encumber the site and premises with products.

.4 All deliveries to the site must be scheduled so that there will be minimal onsite storage. Deliveries through areas open to the public must be approved by the Owner's Representative and timed for minimum disruption. Provide any necessary protection/shoring as required.

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

1.2 Construction Parking

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

.2 Provide and maintain adequate access to project site.

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

1.3 Offices

.1 Space for onsite office will not be provided.

1.4 Equipment, Tool and Material Storage

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

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

1.5 Sanitary Facilities

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

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

1.6 Construction Signage

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

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

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

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

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

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Installation and Removal

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

.2 Remove from site all such work after use.

## 1.3 Hoarding

.1 Erect temporary site enclosure using chainlink fencing, minimum 1.8 metres high. Provide gates as necessary. Maintain fencing in good repair.

.2 Erect protection over all entrances to be maintained during construction in area as defined as limits of construction.

.3 Inform Owner daily via email about the location of their work, and to notify which classrooms and/or indoor space may be affected for that day.

.4 Coordinate with the Owner a full or partial closure of classrooms/ indoor spaces located below their area of work.

## 1.4 Guard Rails and Barricades

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

.2 Provide as required by governing authorities.

## 1.5 Weather Enclosures

.1 Provide secure and weather tight closures to unfinished openings in roofs.

.2 Design enclosures to withstand wind pressure and snow loading.

.3 Design enclosures to meet Owner’s security requirements.

## 1.6 Dust Tight Screens

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

.2 Contractor to provide a minimum of one ventilation/ filtration package for interior air circulation, and to coordinate their location with the Owner during execution of roofing project. Each set to include 2 negative air filter units and 3 industrial turbo fans. Contractor shall provide additional ventilation/ filtration packages if required by TDSB, to ensure adequate indoor air quality.

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

1.7 Access to Site

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

1.8 Public Traffic Flow

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

1.9 Fire Routes

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

1.10 Protection for Off Site and Public Property

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

.2 Be responsible for damage incurred

1.11 Protection of Building Finishes

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

.2 Provide necessary screens, covers, and hoardings.

.3 Contractor to co-ordinate with the Head Custodian/ TDSB trades to have the louvers and fresh air intakes in the vicinity of work and within setup area closed/ turned off/ switched to 100% recycled air mode when required.

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

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

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Quality

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

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

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

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

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

## 1.3 Availability

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

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

## 1.4 Storage, Handling and Protection

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

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

.4 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

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

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

1.5 Transportation

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

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

1.6 Manufacturer’s Instructions

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

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

1.7 Quality of Work

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

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

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

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

1.8 Coordination

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 Concealment

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

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

1.10 Remedial Work

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

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

1.11 Location of Fixtures

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

1.12 Fastenings

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

.2 Prevent electrolytic action between dissimilar metals and materials.

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

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

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

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

1.13 Fastenings – Equipment

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

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

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

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

1.14 Protection of Work in Progress

.1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by Consultant, at no increase in Contract Price or Contract Time.

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

1.15 Existing Utilities

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

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

1.16 Hazardous Materials

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

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 References

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

## 1.3 Submittals

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

.2 Submit to Owner and Consultant copies of the following documents, including updates issued:
  .1 Notice of Project filed with Provincial Ministry of Labour or equivalent for Place of Work
  .2 Site-specific Health and Safety Plan prior to commencement of work on the work site. Plan shall include but not be limited to the following:
    .1 Name and contact info of Contractor's Health and Safety Representative for Work Site; including twenty-four (24) hour emergency contact phone numbers.
    .2 Phone numbers of local fire, police, and ambulance outside of 911 services.
    .3 Location of nearest medical facility and level of injury that each can service.
  .3 Submit to the Owner, Consultant and Municipal Fire Department, for review, a “Fire Safety Plan” conforming to Section 2.14 of the National Fire Code of Canada. Maintain a copy of the “Fire Safety Plan” on site.
  .4 Copies of certification for all employees on site of applicable safety training including, but not limited to:
    .1 WHIMIS.
    .2 Fall arrest and protection.

.3 Suspended Access Equipment.
.4 Erection of Scaffolding.
.5 License for powder actuated devices.
.5 Material Safety Data Sheets (MSDS) of controlled products to be used.
.6 On-site Contingency and Emergency Response Plan addressing:
.1 Standard procedures to be implemented during emergency situations.
.2 Preventative planning and protocols to address possible emergency situations.
.3 Guidelines for handling, storing, and disposing of hazardous materials that maybe encountered on site, including measures to prevent damage or injury in case of an accidental spill.
.4 Incident and accident reports, promptly if and upon occurrence
.1 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
.2 Accident or Incident Reports, within 24 hours of occurrence.
.5 Submit other data, information and documentation upon request by the Consultant as stipulated elsewhere in this section.

1.4 Compliance Requirements

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

1.5 Constructor

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

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

1.6 Safety Requirements

.1 Observe and enforce all construction safety measures and comply with the latest edition and amending regulations of the following documents and in the event of any differences among those provisions, the most stringent shall apply:
.1 Occupational Health and Safety Act and Regulations for Construction Projects, August 1997, Ontario Regulation 213/91 including amendments.
.2 Hazardous Products Act and Canada Labour Code.
.3 The Workplace Safety and Insurance Board, O-Reg 454.
.4 Ontario Building Code Act, Ontario Regulation 332/12 including amendments.
.5 National Building Code of Canada, Part 8: Safety Measures on Construction and Demolition Sites.
.6 National Fire Code of Canada.

.7 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition
.8 Environmental Protection Act.
.9 The Power Commission Act.
.10 The Boiler and Pressure Vessels Act.
.11 The Elevators and Lifts Act.
.12 The Operating Engineer's Act.
.13 Municipal statutes.

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

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

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

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

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

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

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

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

1.7 Safety Meetings

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

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

1.8 Workplace Hazardous Materials Information System (WHMIS)

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

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

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

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

1.9 Fire Protection

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

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

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

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

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

1.10 Accident Reporting

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

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

1.11 Records on Site

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

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Submittals

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

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

## 1.3 Materials

.1 Required for original installation.

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

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

## 1.4 Definitions

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

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

## 1.5 Preparation

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

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

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

.4 Provide supports to assure structural integrity of surroundings; provide devices

and methods to protect other portions of project from damage.

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

1.6 Execution

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

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

.3 Uncover Work to install ill-timed Work.

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

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

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

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

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

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

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

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

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

## PART 2 PRODUCTS

### 2.1 MATERIALS

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

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

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

## PART 3 EXECUTION

### 3.1 Cutting and Patching

.1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  .1 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

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

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

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

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

.6 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

.1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
.2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
.3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
.4 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
.5 Proceed with patching after construction operations requiring cutting are complete.

.7 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
.1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
.2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
.1 Clean piping, conduit, and similar features before applying paint or other finishing materials.
.2 Restore damaged pipe covering to its original condition.

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

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

.1 Progressive Cleaning
.2 Final Cleaning

## 1.2 Project Cleanliness

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

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

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

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

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

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

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

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

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

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

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

# PART 2 PRODUCTS

## 2.1 Products

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

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

## PART 3 EXECUTION

### 3.1 Final Cleaning

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

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

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

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

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

.6 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.7 Remove dirt and other disfiguration from exterior surfaces.

.8 Clean and sweep roofs. Clear all drains.

.9 Sweep and wash clean paved areas.

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

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

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

.1 References.
.2 Submittals.
.3 Definitions.
.4 Waste Management Goals for the Project.
.5 Documents.
.6 Waste Management Plan.
.7 Waste Audit.
.8 Waste Reduction Work Plan.
.9 Materials Source Separation Program.
.10 Disposal of Wastes.
.11 Scheduling.
.12 Storage, Handling and Protection.
.13 Application.
.14 Diversion of Materials.

## 1.2 Related Sections

.1 Section 01 33 00 Submittal Procedures
.2 Section 01 74 11 Cleaning

## 1.3 References

.1 O. Reg. 102/94, Waste Audits and Waste Reduction Work Plans.

## 1.4 Submittals

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

## 1.5 Definitions

.1 Waste Management Plan (WMP): Contractor’s approved overall strategy for waste management including waste audit, waste reduction workplan and materials source separation program.

.2 Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors which contribute to waste.

.3 Waste Reduction Work Plan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

.4 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.5 Waste Management Coordinator (WMC): Designate individual who is in attendance on-site, full-time. Designate, or have designated, individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.

.6 Separate Condition: Refers to waste sorted into individual types.

1.6 Waste Management Goals for the Project

.1 The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing over packaging and poor quantity estimating.

.2 Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling. Waste disposal in landfills or incinerators shall be minimized. On new construction projects this means careful recycling of job site waste.

1.7 Documents

.1 Maintain at job site, one copy of following documents:
.1 Waste Audit
.2 Waste Reduction Workplan
.3 Material Source Separation Plan

1.8 Waste Management Plan

.1 Waste Management Plan: Within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner, submit to the Owner and Consultant a Waste Management Plan. The Plan shall contain the following:
.1 Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight). In the

case of demolition, a list of each item proposed to be salvaged during the course of the project should also be prepared

.2 Alternatives to Land Filling: Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.

.2 Post WMP or summary where workers at site are able to review its content.

1.9 Waste Audit

.1 Prepare Waste Audit prior to project start-up.

.2 Record, on Waste Audit , extent to which materials or products used consist of recycled or reused materials or products

1.10 Waste Reduction Work Plan

.1 Prepare WRW prior to project start-up.

.2 Reduce construction and demolition waste in compliance with O. Reg. 102/94.

.3 Reduction will involve action to minimize quantity of waste at source. Reuse products which would become waste where practical. Recycling will involve collection and source separation at the site, of materials for use as feedstock in manufacturing of new products.

.4 Conform to local Municipal and Regional Landfill Solid waste management requirements. Consider reduction, reuse and recycling of waste generated during construction such as dimensional lumber, clean drywall, concrete, brick, scrap metal and corrugated cardboard.

1.11 Materials Source Separation Program

.1 The Waste Management Plan shall include a Source Separation Program for recyclable waste, and shall be in accordance with the established policies currently in place at the local Municipality, and the requirements of O. Reg. 102/94.

.2 Prepare MSSP and have ready for use prior to project start-up.

.3 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.

.4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.

.5 Provide containers to deposit reusable and/or recyclable materials.

.6 Locate containers to facilitate deposit of materials without hindering daily operations.

.7 Locate separated materials in areas which minimize material damage.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

1.12 Disposal of Wastes

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

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

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

.4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.

.5 Remove waste material and debris from site and deposit in waste container at end of each working day.

.6 Do not permit waste to accumulate onsite.

.7 Burying of rubbish and waste materials is prohibited.

.8 Disposal of waste into waterways, storm, or sanitary sewers is prohibited.

1.13 Scheduling

.1 Coordinate work with other activities at site to ensure timely and orderly progress of the Work.

1.14 Storage, Handling and Protection

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Owner.

.2 Materials from building demolition to be salvaged or re-used are to be removed and salvaged.

.3 Unless specified otherwise, materials for removal become Contractor's property.

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Application

.1 Do work in compliance with Waste Management Plan.
.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

.3 Source separate materials to be reused/recycled into specified sort areas.

### 3.2 Diversion of Materials

.1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Owner, and consistent with applicable fire regulations. Mark containers or stockpile areas. Provide instruction on disposal practices.

.2 On-site sale of materials is not permitted.

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Related Work

.1 Section 01 78 00 Closeout Submittals

## 1.3 References

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

## 1.4 Inspection and Declaration

.1 Contractor's Inspection: The Contractor and all Sub-contractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
  .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  .2 Request Consultant's review.
.2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
.3 Completion: submit written certificate that following have been performed:
  .1 Work has been completed and inspected for compliance with Contract Documents.
  .2 Defects have been corrected and deficiencies have been completed.
  .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
  .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA and other regulatory agencies have been submitted.
  .5 Operation of systems have been demonstrated to Owner's personnel.
  .6 Work is complete and ready for Final Review by the Consultant.
.4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.
.5 Declaration of Substantial Performance: when Consultant consider deficiencies

and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and the Construction Lien Act for specifics to application.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.7 for specifics to application.

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

## PART 2 PRODUCTS

### 2.1 Not Used

.1 Not used

## PART 3 EXECUTION

### 3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 Section Includes

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

## 1.2 Submittals

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

## 1.3 Submission

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

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

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

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

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

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

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

.8 Pay costs of transportation.

1.4 Format

.1 Organize data in the form as instructional manual.

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

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

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

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

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

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

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

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

1.5 Contents Each Volume

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

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

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

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

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

1.6 Occupant Manual

.1 Submit Occupant Manual to Consultant’s requirements.

.2 Occupant Manual to include:
- .1 General building information.
- .2 Building management.
- .3 Building operations.
- .4 Safety.
- .5 Security.
- .6 Environmental considerations.
- .7 Communications.
- .8 Contact List.
- .9 Other/Miscellaneous.

1.7 As Builts and Samples

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

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

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

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

documents for construction purposes.

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

1.8 Recording Actual Site Conditions

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

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

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

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

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

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

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

1.9 Final Survey

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

1.10 Equipment and Systems

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

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

.3 Include installed colour coded wiring diagrams.

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

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

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

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

.8 Include sequence of operation by controls manufacturer.

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

.10 Provide installed control diagrams by controls manufacturer.

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

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

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

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

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

1.11 Materials and Finishes

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

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

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

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

1.12 Spare Parts

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

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

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

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

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

1.13 Maintenance Materials

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

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

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

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

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

1.14 Special Tools

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

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

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

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

1.15 Storage, Handling and Protection

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

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

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

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

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

1.16 Warranties and Guarantees

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

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

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

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

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

.6 Co-execute submittals when required.

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

1.17 Independent Specialty Engineers Sign-Off

.1 Prior to Substantial Performance, provide copies of signed and stamped engineers review and sign-off letters stating that the work has been built in accordance with their drawings and designs. Conditional or vague letters of sign-off will not be accepted. All specialty design engineers for all sub-contractors and suppliers will be required to review the work in progress at appropriate intervals to ensure compliance with their designs and drawings and shall provide final sign-off letters. Provide copies of all field reports issued by specialty engineers. Carry all costs associated with full compliance with this requirement.

## PART 2 PRODUCTS

2.1 Not Used

.1 Not used

## PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

## 1.3 References

.1 The National Building Code of Canada, Part 8, Safety Measures on Construction and Demolition Sites.
.2 CSA Group (CSA)
  .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures
.3 Ontario Regulation 102/94, Waste Audits and Waste Reduction Work Plans.
.4 Ontario Regulation 103/94.Environmental Protection Act.
.5 Ontario Regulation 213/07 The Fire Code.
.6 Ontario Regulation 232/98 Landfilling Sites.
.7 Ontario Regulation 278/05 Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations.
.8 Ontario Regulation 347 Environmental Protection Act, General - Waste Management.
.9 Ontario Regulation 521/03 The Gasoline Handling Act.
.10 The Workplace Health and Safety Act, and Regulations for Construction Projects.
.11 The Gasoline Handling Act, and the Gasoline Handling Code.
.12 The Contractors Health and Safety Policy.
.13 Laws, rules and regulations of other authorities having jurisdiction.

## 1.4 Submittals

.1 Submit detailed written methodology with proposed demolition procedures and including a “Safe Work Plan” to Consultant and Owner for review prior to commencement of demolition at each location.

.2 Submit schedule of demolition activities indicating the following:
  .1 Detailed sequence of demolition and removal work, including start and end dates for each activity.
  .2 Dates for shutoff, capping, and continuation of utility services.
  .3 If hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

.3 Submit the following plans:
- .1 Phasing plan.
- .2 Fire safety plan.
- .3 Hoarding plans.
- .4 Waste management plan.

.4 Submit proposed dust-control measures.

.5 Submit proposed noise-control measures.

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

.7 Provide a phasing plan indicating areas of work and methods of protection. Indicate hoarding, fencing and public way protection locations and details. Schedule and sequence work in accordance with the phasing plans.

.8 Drawings for structural elements of the demolition process including shoring and overhead work shall bear signature and stamp of qualified professional engineer registered in the Province of Ontario.

.9 Submit proof that all personnel involved in the removal and handling of hazardous material are trained and certified in the safe removal and handling of such materials.

.10 Submit waste reduction progress reports. Include the following in the reports:
- .1 Material Category/Type
- .2 Where waste was generated
- .3 Total quantity of waste in tons.
- .4 Total quantity salvaged, in tons
- .5 Total quantity recycled, in tons
- .6 Total quantity recovered (salvaged + recycled), in tons
- .7 Total quantity recovered as a percentage of total waste.

.11 At Project Closeout: Submit record drawings and Identify and accurately locate capped utilities and other architectural, structural, electrical, or mechanical conditions.

1.5 Permits

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

.2 The Consultant will complete General Review during demolition in accordance with the Ontario Building Code, Division C., Part 1, Article 1.2.2.3. All other engineering required for shoring design and for other structural elements of the demolition work will be completed by the Contractor's own engineer and paid for by the Contractor.

1.6 Engineering Design

.1 Engage the services of a qualified professional engineer registered in the Province of Ontario to review existing structure and prepare drawings for structural elements of the demolition process including shoring and overhead work.

1.7 Services

.1 Arrange and pay for all utility locates.

.2 Ensure that all services to areas of the building to be demolished are disconnected. Purge and drain all lines.

.3 Arrange for disconnection of public utilities with the respective utility company or municipal department.

.4 Make service disconnects as identified on drawings and as required.

.5 Coordinate work in the vicinity of overhead power lines with the local Power Authority and in accordance with Ministry of Labour requirements.

1.8 Work Included

.1 Complete abatement, removal and disposal of all designated hazardous materials as identified in hazardous materials report by ECOH in Appendix "A".

.2 Decommissioning and removal of all mechanical systems (HVAC, plumbing, fire protection) including drainage and purging of all equipment and piping including all coordination with Boards forces for removal of solar electric equipment

.3 Removal and disposal of entirety of roof. Removals to include but not be limited to, all roofing components from deck up and as detailed on drawings. Siporex deck and as detailed on structural drawings.

1.9 Definitions

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

.2 Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing.

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

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

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

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

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

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

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

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

1.10 Quality Assurance

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

.2 Abatement Contractors: Only abatement contractors licensed in the province of Ontario and approved by the Owner are permitted to undertake designated substances abatement and removal.

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

.4 Pre-demolition Conference: Conduct a conference at Project site.
- .1 Review the environmental goals of this Project with Contractors, subcontractors, and waste haulers and make a proactive effort to increase awareness of these goals among all labor forces on site.
- .2 Review schedule and scheduling procedures.
- .3 Review health and safety procedures.
- .4 Review of Designated Substances and Hazardous Materials Survey
- .5 Review of Project conditions including review of record photographs.

1.11 Temporary Ventilation

.1 Provide all required temporary ventilation for demolition work. Provide the use of Hepa filters to ensure air quality at each facility.

1.12 Shoring and Bracing

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

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

1.13 Project Site Conditions

.1 The Owner assumes no responsibility for the actual condition of the structures..

.2 Construct safety barriers, barricades, fencing and hoarding to separate public from work areas.
.3 Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. Variations within the structures may occur by the Owner's salvage operations prior to start of demolition.

PART 2 PRODUCTS

2.1 Materials

.1 All building materials removed from the building shall become the property of the Contractor unless specified otherwise and shall be removed from the Site.

.2 Conform to requirements of the General Conditions and Division 1, General Requirements, in particular, articles on Design and Safety Requirements for Temporary Work. Provide materials necessary for temporary shoring. On completion, remove temporary materials from site.

.3 Recycling:
.1 All materials from demolition and land clearing which can be recycled through local municipal programs and which are not scheduled for salvage shall be sorted and separated in accordance with Regional, Provincial and Municipal standards and regulations.
.2 Documentation must be kept of all recycled material in order to fill out waste reduction progress reports.
.3 Recycle paper and beverage containers used by onsite workers. Provide recycling receptacles for the duration of construction activities at the building site.
.4 Items of salvageable value to the Contractor may be removed from the

structure as the work progresses.

.5 All concrete, masonry, asphalt and similar materials shall be crushed prior to removals from site.

2.2 Designated Substances

.1 Refer to Designated Substances and Hazardous Materials Survey in Appendix “A”,

.2 Provide and maintain all required temporary construction facilities and enclosures as required during removal of designated substances.

PART 3 EXECUTION

3.1 Phasing

.1 Schedule and sequence work in coordination with the owner.

3.2 Examination

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

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

.3 Assess effects of demolition at adjacent building(s), structure(s) and consider need for shoring and/or bracing.

.4 Investigate for following conditions:
.1 load bearing walls and floors
.2 structure suspended from another
.3 cantilevered construction
.4 presence of hazardous materials

.5 Contact authorities or utility companies for assistance in locating and marking services which may affect demolition. Such services can include:
.1 electrical power lines
.2 gas mains
.3 oil pipelines

.4 communication cables
.5 water mains and fire mains
.6 drainage piping (storm and sanitary)
.7 steam distribution
.8 fibre optics

3.3 Protection

.1 Refer to designated substances reports including recommendations for the control of dust. Submit to the Owner and Consultant, work plans including plans for the control of airborne dust containing possible mold spores, and hazardous substances. Ensure that all necessary controls are in place at the beginning of each work period which will prevent to spread of contaminated material beyond the work area limits. Stop work immediately if there exists any possibility of the spread of contaminated materials.

.2 Provide, erect and maintain required temporary sidewalk sheds, catch platforms, lights and other protection around site before commencing work. Maintain such areas free of snow, ice, mud, water and debris.

.3 Provide flagmen where necessary or appropriate, to provide effective and safe access to Site to vehicular traffic.

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

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

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

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

.8 At all times protect the structure from overloading.

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

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

.11 Take precautions to guard against movement, settlement or collapse of adjacent structures, services, sidewalks or driveways. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repair promptly such damage when ordered.

3.4 Environmental Controls

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

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

.3 Noise Control: Perform demolition operations to minimize noise.
- .1 Repetitive, high level impact noise will be permitted only between the hours of 8:00 a.m. and 6:00 p. m. Repetitive impact noise on the property shall not exceed the following dB limitations:

| Sound Level in dB | Time Duration of Impact Noise |
|---|---|
| 60 db | More than 12 minutes in any hour |
| 70 dB | More than 3 minutes in any hour |

- .2 Provide equipment, sound deadening devices, and take noise abatement measures that are necessary to comply with the requirements of this Contract and with municipal regulations.

.4 Salvage, Re-Use, and Recycling Procedures:
- .1 Identify re-use, salvage, and recycling facilities.
- .2 Develop and implement procedures to re-use, salvage, and recycle demolition materials, based on the Contract Documents, the Contractor's Waste Management and Recycling Plan, estimated quantities of available materials, and availability of recycling facilities. Procedures may include on-site recycling, source-separated recycling, salvage, and/or mixed debris recycling efforts.
- .3 Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
- .4 Source-separate clean and uncontaminated demolition materials including, but not limited to the following types:

.1 Rigid Foam
.2 Glass
.3 Plastics
.4 Insulation
.5 Gypsum Board
.6 Metal (ferrous and non-ferrous)
.7 Wood, Clean Dimensional Wood, Pallet Wood
.8 Sheet Wood: Plywood, Oriented Strand Board (OSB), Particle Board
.9 Beverage Containers
.10 Paper: Bond, Newsprint, Cardboard, Paper, Packaging Materials
.11 Other materials as appropriate.

.5 Develop and implement a program to transport loads of mixed demolition materials that cannot be feasibly source separated to a mixed materials recycling facility.

## 3.5 Performance

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

.2 Demolition shall proceed safely in systematic manner, as specified herein, and as necessary to accommodate remedial work indicated.. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.

.3 At end of each day's work, leave work in safe condition ensuring that no parts of structure are in danger of collapsing.

.4 Maintain and preserve active utilities traversing premises.

.5 Keep work wetted down to minimize dust.

.6 Upon completion of demolition work, level and clear site or prevent access to excavations by means of fences or hoardings.

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

## 3.6 Demolition and Removals

.1 Maintain the work areas and storage areas clean and orderly at all times and free of rubbish and debris.

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

.3 Particular attention shall be paid to prevention of fire and elimination of fire hazards.

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

.5 Demolish building completely and remove from site.

.6 Execute all cutting and removal of existing building, including roof deck, roofing and other removals as required.

.7 All damage caused to the existing building interior and/or equipment, etc by the neglect of the Contractor or any of his forces shall be made good at the expense of the Contractor including all costs and charges which may be claimed by the Owner for damages or loss of production suffered.

.8 The following methods of demolition will not be permitted:
.1 Use of explosives.

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

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

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

.12 Use methods required to complete the work within limitations of governing regulations.

.13 Remove all disconnected or abandoned utilities.

.14 Damages: Promptly repair damages to facilities caused by demolition operations

.15 Be responsible for maintaining the existing building in a weather and watertight condition at all times until the completion and acceptance of the work. Remove only as much roofing and siporex as can be replaced in one day.

.16 Removal of items indicated on the drawings shall mean all adhesives, fasteners, anchors, appurtenances, and the like as necessary to prepare substrates for the installation of new construction, finishes and equipment.

.17 Remove and dispose of roofing, underlayments, roof insulation, vapour retarders, flashing, trim and accessories for extent indicated. Dispose of all materials off site, in approved landfill sites and in accordance with local regulations for waste disposal.

.18 Remove all existing metal parapet flashings and counterflashings.

.19 Refer to Section 07 52 00 for temporary removal of existing roof equipment. Ensure all work is protected during demolition of roofing systems.

.20 Refer to structural notes and spec for removal of siporex deck.

3.7 Hazardous Materials

.1 Safely remove and dispose of identified substances in accordance with all applicable legislation. Utilize licensed and qualified personnel and sub-trades to execute this work.

.2 Provide backup documentation as necessary to verify disposal sites for any designated substances removed from the site.

3.8 Handling of Demolished Materials

.1 Conform to the approved Waste Management Plan.

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

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

.4 Disposal: Transport demolished materials off Owner’s property and legally reuse, salvage, recycle, or dispose of materials.

.5 Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

.6 Become familiar with the conditions for acceptance of new construction,

excavation and demolition materials at recycling facilities prior to delivering materials.

.7 Use a permitted waste hauler or Contractor's trucking services and personnel.

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

.9 Remove and transport materials from demolition in a manner that will prevent spillage on adjacent surfaces, streets, and areas or dust being emitted into the atmosphere.

.10 Implement a re-use program to the greatest extent feasible.

.11 Revenues or other savings obtained from recycled, re-used, or salvaged materials shall accrue to Contractor unless otherwise noted.

3.9 Deck Repairs

.1 Concrete Decking: Areas of concrete decking to remain, with pitted or deteriorated surfaces are to be cleaned sufficiently to receive repair material. Repairs to be completed with quick set masonry repair grout trowelled to a smooth even finish, flush with surrounding areas.

3.10 Cleaning

.1 Upon completion of demolition work, level and clear site or prevent access to excavations by means of fences or hoardings.

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

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

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

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 05 31 00 Steel Deck
.2 Section 05 41 00 Structural Metal Stud Framing

## 1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A108-18 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
  .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .3 ASTM A153/A153M-16a Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  .4 ASTM A307-14e1 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  .5 ASTM A653/A653M-20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .6 ASTM A1011/A1011M-18a Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
  .7 ASTM F3125/F3125M-19e2 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
.2 CSA Group (CSA)
  .1 CSA G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel.
  .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .3 CSA S16-14 Design of Steel Structures.
  .4 CSA S136-07 North American Specification for the Design of Cold Formed Steel Structural Members, Includes Update No. 1 (2009), Update No. 2 (2010).
  .5 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding of Steel Structures.

.6 CSA W48-18 Filler Metals and Allied Materials for Metal Arc Welding.
.7 CSA-W55.3-08 (R2013) Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
.8 CSA W59-13 Welded Steel Construction (Metal Arc Welding).
.9 CSA W178.1-18 Certification of Welding Inspection Organizations.
.10 CSA W178.2-18 Certification of Welding Inspectors.

.3 Structural Steel Painting Council
.1 SSPC-SP 6-91 Commercial Blast Cleaning.

.4 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)
.1 CISC/CPMA 1-73a Quick-Drying, One-Coat Paint for Use on Structural Steel.

.5 American Institute of Steel Construction (AISC)
.1 Code of Standard Practice for Steel Buildings and Bridges, Section 10, Architectural Exposed Structural Steel, latest edition.

.6 The National Building Code of Canada.

## 1.4 Submittals

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

.2 Submit shop and erection drawings. Submit typical details of connections and any special connections for review before preparation of shop drawings. Assume responsibility for the accuracy of Work. Review of submitted shop drawings is to ensure only that the Contract Documents are being correctly interpreted.

.3 Professional Engineer responsible for connection design shall sign and seal each shop drawing.

.4 Show on shop drawings the size, spacing, and the location of structural steel members; connections; attachments; reinforcing; anchorage and required inserts; and all necessary plans, elevations and details.

.5 Show splice locations and details.

.6 Welded connections shall be designated by welding symbols in compliance with American Welding Society, AWS 2.068, Welding Symbols, and indicate clearly net weld lengths.

.7 Submit design calculations if requested by the Consultant.
.8 Submit diagrams showing methods of erection.

.9 Field Work Drawings shall be submitted as shop drawings.

.10 Notify Consultant in writing of any deviations in shop drawings from the requirements of the Contract Documents.

.11 Submit a schedule of fabrication to the Consultant and the Testing Agency, prior to commencement of fabrication.

1.5 Qualifications

.1 Undertake welding and/or welding inspection by welders fully approved to one or more of the reference codes and standards where applicable.

1.6 Quality Assurance

.1 Connections:
  .1 Connections designed by Engineer: Submission of shop drawings for connection which have been detailed on Drawings shall represent acceptance by Contractor that connection can be executed successfully.
  .2 Design of other connections which cannot be selected from standard designs tabulated in CISC Handbook of Steel Construction shall be by a Professional Engineer, licensed in the Province of Ontario, experienced in structural steel connection design.
  .3 Consultant will review connection arrangement to verify general conformance with overall design concept of structure.
  .4 Connection design engineer shall be insured for professional liability in accordance with section 74 subsection (1) of Regulation 941 of the Ontario Professional Engineers Act. The alternative of compliance with subsection (2) is not acceptable.
  .5 Provide connections adequate to resist reaction of beam, when beam is loaded to maximum flexural capacity under uniformly distributed load, unless reaction or connection detail is shown on Drawings.
    .1 Provide flexible beam connections for unrestrained members in accordance with CSA S16.1, unless shown otherwise on Drawings.
    .2 Select connections, wherever possible, from standard designs tabulated in current edition of CISC Handbook of Steel Construction, except that length of beam web angles shall not be less than half the depth of beam, and single angles shall not be used.
    .3 Provide direct connections to flanges of spandrel beams (exterior perimeter beams) to restrain twisting.

.2 Design:
  .1 Connections:

.1 Provide bolted or welded connections, unless shown otherwise on Drawings.
.2 Use high strength bolts to ASTM F3125 for all connections.
.3 Use slip resistant (friction-type) connections for bolted joints designed to resist reversible forces.
.4 Provide tension adjustment hardware at rod type bracing and at flat bar type bracing.
.5 Do not permit connections to encroach on clearance lines required for installation of Work of other Sections.

.3 Random Splicing: Obtain in writing from Consultant, prior to commencement of shop drawings, special requirements that will be imposed as a necessary condition of acceptance of members with randomly located butt welded splices.

.4 All edge perimeter angles and bent plates installed at roof framing level shall be joined by butt weld splices designed for full tension capacity of members being joined.

1.7 Tolerances

.1 In addition to tolerances specified in CSA S16, erect shelf angles and sash angles attached to steel frame within a tolerance of 3 mm plus or minus, with abutting ends of members at the same level.

1.8 Inspection and Testing

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

.2 Inspection and testing of materials and shop fabrication of Work of this Section, and field quality control, will be performed by an independent Inspection and Testing Company. Refer to Section 01 45 00 - Quality Control.

.3 The Inspection and Testing Company shall meet qualification requirements of CSA W178.1 and shall be certified by the Canadian Welding Bureau in Category 1 Buildings.
.4 Welding Inspectors and supervisors shall be certified by Canadian Welding Bureau to CSA W178.2, to minimum level 2 certification.

.5 Provide free access for inspectors to all places work is being performed, whether on site or off.

.6 Mill inspection shall ensure that materials conform to specified requirements. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests.

.7 Shop inspection shall ensure that structural steel is fabricated in accordance with the shop drawings, and the specified fabrication and welding procedures.

.8 The cost of inspection and testing of splices introduced by the fabricator and not required on the Contract Documents will be paid by the Contractor.

.9 Inspection and Testing Company when appointed shall carry out shop inspection to verify:
- .1 Structural materials and paint conform to Specifications. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests of structural materials.
- .2 Fabrication and welding conforms to Specifications and dimensioned shop drawings.
- .3 Shop cleaning and preparation and prime painting to conform to specified requirements.
- .4 Surfaces inaccessible for cleaning and painting after assembly are treated before assembly.
- .5 For surfaces painted with zinc rich paint or zinc primer, specified surface preparation is followed and specified paint thickness is applied.

.10 Non-destructive Testing of Welded Connections: Carry out non-destructive testing of welded connections chosen at random as follows:
- .1 Check and record steel member sizes for 20% of columns, beams and girders.
- .2 Check 5% of all welds by magnetic particle inspection.
- .3 Check 25% of moment connections and all connections subject to direct tension involving use of full penetration groove welds by ultrasonic testing.
- .4 Check 10% (minimum 2 per connection) in accordance with Section 23 of CSA S16 of pretensioned connections including main building bracing connections.

.11 More frequent testing and inspection shall be completed if random tests described above are not satisfactory. These costs are to be paid by the Contractor.

1.9 Shipping, Handling and Storage

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

.2 Deliver products that are only supplied under work of this Section to those who are responsible for their installation, to the work site as directed and to meet construction schedule.

.3 Handle and store structural steel in such a manner that no damage, including corrosion, is caused to the stored or erected work, or to other property.

.4 Store structural steel off of ground on timber supports.

1.10 Waste Management and Disposal

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

## PART 2 PRODUCTS

### 2.1 Materials

.1 Rolled shapes, hollow structural sections, plates and rods: new steel, in compliance with CSA and/or ASTM Standards indicated on Structural Drawings.

.2 Welding Electrodes: to meet the requirements set forth in the applicable standard of the CSA W48 Series on welding electrodes. (Any process which produces deposited weld metal meeting the requirements of the applicable W48 Series Standard for any grade of arc welding electrodes shall be accepted as equivalent to the use of such electrodes.)

.3 High Strength Bolts: to meet specified requirements of ASTM F3125

.4 Machine Bolts: to meet specified requirements of ASTM A307.

.5 Shop Coat Paint:
.1 Interior structural steel: To meet specified requirements of CISC/CPMA 1-73a and compatible with Master Painters Institute INT 5.1S or 5.1X Institutional low odour/low VOC semi-gloss finish. Colour to be grey.

.6 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A153.

## PART 3 EXECUTION

## 3.1 Fabrication

.1 Fabricate work of this Section in compliance with CSA S16, and as specified following.

.2 Connections:
- .1 Make bolted or welded connections.
- .2 Use high strength bolts unless otherwise noted on Drawings.
- .3 Use friction type high strength bolts for the connections of bracing members (diagonal kickers) resisting the effects of applied lateral loads. Provide tension adjustment at flat bar and rod type lateral bracing.
- .4 Do not permit connections to encroach on the clearance lines required for the installation of work of this Section.

.3 Beam Connections:
- .1 Provide beam connections adequate to resist the reactions produced by the framing or load conditions.
- .2 Provide beam to column connections that apply vertical reaction with negligible eccentricity at the connecting face of the column, such as single or double beam web connections, end plate connections or un-stiffened seats, unless otherwise shown on Drawings. Submit for review, in advance of the preparation of shop drawings, connections which do not meet these requirements.
- .3 Provide connections complying with the requirements of the CISC Handbook of Steel Construction, except that the length of beam web angles shall not be less than half the depth of the beam and single angles shall not be used.
- .4 Provide direct connections to flanges of spandrel beams to restrain twisting.

.4 Holes in Structural Members:
- .1 Punch holes 11 mm to 27 mm in diameter as required for attaching the work of other Sections to structural steel members. Locate holes so that no appreciable reduction of the strength of members is caused.
- .2 Provide holes for pipes and ducts, and reinforce openings as indicated on drawings. Cutting of holes in structural members in the field will not be permitted except with written approval of the Consultant.
- .3 Provide effective drainage holes to prevent the accumulation of water in tubular members.

.5 Member Separators: Provide separators at approximate spacing of 1200 mm o.c. for double beams and channels as follows:
.1 For beams and channels 225 mm or less in depth: one or two rows of pipe separators.
.2 For beams and channels over 225 mm in depth: channel separators, unless otherwise detailed on Drawings.

.6 Structural Steel Painting: All prime painting shall be shop applied and the responsibility of the steel fabricator. Refer to specific priming requirements specified in Section 09 91 23 - Interior Painting.
.1 Paint in accordance with manufacturer's published directions. Paint steel in the shop under cover. Keep painted members under cover until the paint has dried.
.2 Where paint is applied adjacent to welded joints, remove it to bare metal for a distance of at least 50 mm beyond sides of joints.
.3 Do not paint surfaces and edges to be field welded, contact surfaces of friction type connections assembled by high strength bolts, surfaces encased in or in contact with concrete.

## 3.2 Examination

.1 Verify, before delivery of structural steel, that work of other Sections on which work of this Section is dependent is correctly installed and located.

## 3.3 Preparation

.1 Supply anchor bolts, base and bearing plates and other members to be built in under work of other Sections as the work progresses. Cooperate with installers of this work and provide instructions for setting items to be built in.

## 3.4 Erection

.1 Comply with CSA S16 and work site safety plans in erection of work of this Section.

.2 Make adequate provision for horizontal and vertical erection loads and for sufficient temporary bracing to keep structural frame plumb and in true alignment until the completion of erection, and the installation of masonry, concrete work, and floor and roof decks which provide the necessary permanent bracing.

.3 Provide temporary steel members as may be required for erection purposes and remove them when no longer required.

.4 Installation of Bearing and Column Base Plates: Install bearing plates and standard wall anchors for beams bearing on masonry or concrete.
.1 Set loose beam bearing plates and column base plates, at proper elevation, true and level, with steel shims, ready for grouting as specified under work of other Sections.
.2 Set loose bearing plates and/or levelling plates to be cast into concrete.

## 3.5 Coating Touch-Up

.1 Clean welds with wire brushes and wash down with clean water to ensure no residue from electrodes is present.

.2 After erection, give one coat of prime coat or zinc rich paint as applicable and specified for shop coat to field bolts, field connections, burnt areas, and abrasions or damage to shop coats.

.3 Touch up all areas with a specified paint film thickness.

.4 Give areas of bare metal on galvanized members two coats of zinc-rich paint. Repair coating on architecturally exposed galvanized metals in accordance with reference standards and as directed by the Consultant. Replace any materials where damage cannot be repaired to the satisfaction of the Consultant.

## 3.6 Field Quality Control

.1 Inspection and Testing Company, when appointed as specified in Source Quality Control elsewhere in this Section, shall perform:
.1 Inspection of erection and fit-up, including placing, plumbing, levelling and temporary bracing and conformance with specified tolerances.
.2 Inspection of bolted connections, including verification that ASTM A307, ASTM F3125 snug tight only bolts, and ASTM F3125 pre-tensioned bolts have been installed and used appropriately, and that threads are excluded from shear plane where required.
.3 Inspection of welded joints, including slag removal.
.4 General inspection of field cutting and alterations; report immediately to Consultant, any alterations or cutting not shown on reviewed shop drawings.
.5 General inspection of shop coating touch-up.
.6 Inspection of zinc primer and zinc-rich paint, including surface preparation and coating thickness.

## 3.7 Defective Work

.1 Variations in excess of specified tolerances, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective Work performed by this Section.

.2 Replace defective Work, as directed by Consultant.

.3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses if Work has proven to be deficient.

## 3.8 Cleaning

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

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 05 12 23 Structural Steel

## 1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A653/A653M-20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
.2 CSA Group (CSA)
  .1 CSA S16-09 Design of Steel Structures
  .2 CSA S136-07 North American Specification for the Design of Cold Formed Steel Structural Members, Includes Update No. 1 (2009), Update No. 2 (2010)
  .3 CSA W47.1-09 Certification of Companies for Fusion Welding of Steel Structures.
  .4 CSA W48-06 (R2011) Filler Metals and Allied Materials for Metal Arc Welding
  .5 CSA W55.3-08 Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  .6 CSA W59-03 (R2008) Welded Steel Construction (Metal Arc Welding)
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 1.181-99, Ready-Mixed Organic Zinc-Rich Coating
.4 Canadian Sheet Steel Building Institute (CSSBI)
  .1 CSSBI 10M Standard for Steel Roof Deck.
  .2 CSSBI 12M Standard for Composite Steel Deck.
  .3 CSSBI SSF 16-14 Acoustic Properties of Perforated Steel Deck

## 1.4 Submittals

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

.1 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Ontario, Canada. Each submission of the shop drawings shall bear the seal of the Engineer.

.1 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.
.2 Indicate details of temporary shoring of steel deck.

.2 Submit design calculations if requested by Consultant.

1.5 Design Requirements

.1 Design steel deck using limit states design in accordance with CSA S136-07 and CSSBI 10M.

.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, and uplift as indicated.

.3 Deflection under specified live load not to exceed 1/240 of span, except that when gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.

.4 Design composite deck sections in accordance with the National Building Code of Canada for concrete strength indicated on drawings.

.5 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CSA S16.

1.6 Shipping, Handling and Storage

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

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

1.7 Waste Management and Disposal

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

.2 Divert unused metal from landfill to metal recycling facility.

.3 Dispose of unused paint material at official hazardous material collections site.

.4 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

## PART 2 PRODUCTS

### 2.1 Materials

.1 Manufacturer: Canam Group Inc. or equal
  .1 Product
    .1 36 in. wide Type P-2436 or P-2404 non composite, 36 in. wide Types 1.5B, 1.5BI or equal.

.2 Sheet Steel: ASTM A653 minimum Grade 230 with a base steel design thickness or 0.76 mm or greater and a minimum zinc-iron alloy coating designation of ZF75.

.3 Acoustic insulation: fibrous glass 17.5 kg/m3 density profiled to suit deck flutes.

.4 Closures: in accordance with manufacturer's recommendations.

.5 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm. Metallic coating same as deck material.

.6 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

.7 Caulking: to Section 07 92 00- Joint Sealants.

.8 Shear studs: to CSA W59.

### 2.2 Types of Decking

.1 Deck shall conform to the depths noted on the drawings.

.2 Steel roof deck: to CSSBI 10M non-cellular, interlocking side laps. Base steel thickness, depth & profile as shown on the drawings.

## PART 3 EXECUTION

### 3.1 General

.1 Structural steel work: in accordance with CSA S136 and CSSBI 10M.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.2 Erection

.1 Erect steel deck as indicated and in accordance with CSA S136, CSSBI 10M, CSSBI 12M and with reviewed erection drawings.

.2 Lap ends: to 50 mm minimum.

.3 Place and support reinforcing steel as indicated.

.4 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.

.5 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

.6 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.

3.3 Closures

.1 Install closures in accordance with approved details around all deck openings for units and to trim out the end of the roof around the perimeter of the steel deck.

3.4 Openings and Areas of Concentrated Loads

.1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer, except as otherwise indicated.

.3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.5 Connections

.1 Install connections in accordance with CSSBI recommendations as indicated.

3.6 Cleaning

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

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 07 51 00 Built up Bituminous Roofing
.2 Section 07 62 00 Sheet Metal Flashing and Trim

## 1.3 References

.1 Canadian Standards Association (CSA)
  .1 CSA-080-M Wood Preservation
  .2 CSA-080.1 Preservative Treatment of all Timber Products by Pressure Processes.
  .3 CSA 080.9 Preservative Treatment of Plywood by Pressure Processes.
  .4 CSA 086.1 Engineering Design in Wood (Limit States Design).
  .5 CSA 0121-M Douglas Fir Plywood.
  .6 CSA 0141 Softwood Lumber.
  .7 CSA 0151-M Canadian Softwood Plywood
  .8 CAN3-0437.0-M85 Waferboard and Strandboard
  .9 CSA B111 Wire Nails, Spikes and Staples.
  .10 CSA G164 Hot Dip Galvanizing of Irregularly Shaped Articles.
.2 Underwriters Laboratories Canada (ULC)
  .1 CAN/ULC-S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.3 National Lumber Grading Authority (NGLA)
  .1 Standard Grading Rules for Canadian Lumber, Latest Edition.

## 1.4 Submittals

.1 When required by authorities having jurisdiction, submit sequential erection drawings indicating all necessary false work, temporary construction bracing and hoisting.

## 1.5 Quality Assurance

.1 Sawn lumber shall be identified by the grade stamp of an association or independent grading agency certified by the Canadian Lumber Standards Accreditation Board.

.2 All workmanship and installation shall conform to the requirements of the Ontario Building Code, Part 9.

## 1.6 Shipping, Handling and Storage

.1 Materials shall not be delivered before they are required for proper conduct of the work.
.2 Protect materials, under cover, both in transit and on the site.

.3 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.

.4 Protect work from damage during storage, handling, installation and until the building is turned over to the Owner. Make good damage and loss without additional expense to the Owner.

.5 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.

## PART 2 PRODUCTS

### 2.1 Materials

.1 General: Use materials specified herein.

.2 Timber Material shall be 'Grade Stamped'.

.3 Construction Lumber: To CAN/CSA 0141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
- .1 Framing lumber, plates, furring, blocking, No. 1 SPF.
- .2 Nailing strips, furring and strapping: No. 4 S-P-F.
- .3 Fitment framing: No. 1 S-P-F.

.4 Canadian Softwood Plywood: to CSA 0151-M, standard construction, good one or both sides as required, thickness as shown or specified.
- .1 Douglas Fir Plywood: To CSA 0121-M, standard construction, good one side, thickness as shown on the drawings.

.5 Nails, Spikes and Staples: To CSA B111.

.6 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.

.7 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.8 Nailing Discs: flat caps, minimum 25 mm diameter, minimum 26 gauge thick, sheet metal, formed to prevent dishing.

.9 Galvanizing: To CAN/CSA-G164.

.10 Sealant: 'Mono' as manufactured by Tremco Manufacturing Ltd. or equivalent.

.11 Wood Preservative to CAN/CSA-080-M.

.12 Adhesive: Contractors gun grade cartridge loaded wood adhesive, general purpose, to CSA 0112 Series and CAN/CGSB-71.26.

.13 Building Paper: to CAN2-51.32-M, 15# asphalt impregnated paper

.14 Vapour Retardant: 0.152 mm polyethylene film to CAN/CGSB 51.34 Type 1.

.15 Fibreglass Insulation: to CSA A101, loose batt type, minimum density of 1.5 pcf.

.16 Galvanizing: to CAN/CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.

## PART 3 EXECUTION

### 3.1 Installation

.1 Workmanship:
- .1 Comply with the requirements of the Ontario Building Code,
- .2 Execute work using skilled mechanics according to best practice, as specified here.
- .3 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.

.2 Rough Hardware:
- .1 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.

.3 Roof Blocking, Curbs and Copings
- .1 Provide and install framing, blocking, curbs and copings as indicated on the drawings. Anchor blocking securely in permanent manner as indicated on the drawings.
- .2 Provide 10 mm Douglas Fir plywood copings on all built-up wood copings and curbs as detailed.
- .3 Repair any damaged or rotted wood curbs.
- .4 All curbs shall be filled with fibrous insulation.
- .5 Inspect existing wood roof curbs and copings and replace all rotted or damaged material.
- .6 Supply anchor bolts to mason for embedding into masonry walls as indicated.

.4 Surface Applied Wood Preservative

.1 Treat surfaces of material with wood preservative before installation. Apply preservative after materials have been cut and fit to size. To cut end two coats of preservative shall be applied.

.2 Apply preservative by dipping, or by brush or spray to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.

.3 Retreat surfaces exposed by cutting, trimming, or boring with 2 coats of brush application of preservative before installation.

.4 All wood in contact with masonry or concrete shall be dipped in a tank of preservative for two minutes after fabrication.

.5 Provide treated wood nailers, blocking, cants, grounds and similar members where shown and where required for screeding or attachment of other work and surface applied items. Attach to substrate as required to support applied loading.

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 02 41 00 Demolition
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 62 00 Sheet Metal Flashing and Trim
.4 Section 07 71 00 Roof Specialties and Accessories
.5 Section 07 92 00 Joint Sealants

## 1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C208-12 (2017) e1 Standard Specification for Cellulosic Fiber Insulating Board
  .2 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  .3 ASTM C1278/C1278M-17 Standard Specification for Fiber-Reinforced Gypsum Panel
  .4 ASTM D226/D226M-17 Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
  .5 ASTM D1863/D1863M-05(2018) Standard Specification for Mineral Aggregate Used on Built-Up Roofs
  .6 ASTM D2178/D2178M-15a Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
  .7 ASTM D3746/D3746M-85(2015)e1 Standard Test Method for Impact Resistance of Bituminous Roofing Systems
  .8 ASTM D4586/D4586M-07(2018) Standard Specification for Asphalt Roof Cement, Asbestos-Free
  .9 ASTM D4601/D4601M-04(2012)e1 Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing
  .10 ASTM E96/E96M-16 Standard Test Methods for Water Vapor Transmission of Materials
.2 CSA Group (CSA)
  .1 CAN/CSA-A123.2-03 (R2018) Asphalt-Coated Roofing Sheets.
  .2 CAN/CSA A123.3-05 (R2015) Asphalt Saturated Organic Roofing Felt
  .3 CAN/CSA-A123.4-04 (R2018) Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems
  .4 CAN/CSA-A123.16-04(R2014) Asphalt-Coated Glass Base Sheet.

.5 CSA A123.17-05(R2014) Asphalt Glass Felt Used for Roofing and Waterproofing.
.6 CAN/CSA-A123.21-14 Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
.7 CAN/CSA A247-M86 (R1996) Insulating Fibreboard

.3 Canadian General Services Board (CGSB)
.1 CAN/CGSB-37.5,Cutback Asphalt Plastic Cement.
.2 CGSB 37-GP-9Ma Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
.3 CGSB 37-GP-15M Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
.4 CGSB 37-GP-19M, Cement Plastic, Cutback Tar.
.5 CAN/CGSB-37.29 Rubber-Asphalt Sealing Compound.
.6 CAN/CGSB-51.33-M Vapour Retarder Sheet, Excluding Polyethylene, for Building Construction.

.4 Underwriters Laboratories of Canada (ULC)
.1 ULC 102-18 Test for Surface Burning Characteristics of Building Materials and Assemblies.
.2 ULC 704-11 Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.
.3 ULC 770 -15 Standard Test Method for Determination of Long Term Thermal Resistance of Closed Cell Thermal Insulating Foams.
.4 Underwriters' Laboratories of Canada (ULC) List of Equipment and Materials Volume II Building Construction including supplements to date.

.5 Canadian Roofing Contractors Association (CRCA) Metric Specification Manual.
.6 Factory Mutual Engineering Corporation (FM): Loss Prevention Data, Insulated Steel Deck 1-28, FM Approval Guide including Revisions to date.

## 1.4 Submittals

.1 Submit complete list of all products intended for use, together with samples and manufacturer’s technical literature.

.2 Submit verification that materials and products meet performance requirements specified in the Referenced Standards.

.3 Submit shop drawings of all components and accessories and including layout drawings and details for the tapered insulation system. Submit shop drawings for prefabricated work.

.4 Submit shop drawings detailing roof size, membrane sheet placement, location and type of penetrations, type of vapour retarder, insulation and insulation fasteners.

.5 Submit shop drawings for tapered insulation. Indicate degree of slope and layout of sloping boards and fill boards on roof surfaces. Ensure positive drainage to roof drains.

## 1.5 Quality Assurance

.1 Provide built-up roofing systems including insulation and all related materials to conform to ULC Class A design criteria, as shown and as specified herein.

.2 The roofing Contractor shall be of recognized standing with a proven record of satisfactory installations, and shall be a member in good standing of the Canadian Roofing Contractors Association and/or the Ontario Industrial Roofing Contractors Association.

.3 Roofing work shall be executed under the full time supervision of a competent foreman.

.4 A membrane manufacturer's representative shall be available to review installation procedure and to impact the completed installation to verify compliance with all specifications and details.

.5 Prior to scheduled commencement of the roofing installation and associated work, conduct a pre-construction meeting at the project site with the installer, Consultant, Owner, roof manufacturer’s representative and any other persons directly involved with the performance of the work. Record conference discussions to include decisions, agreements, and open issues and furnish copies of recorded discussions to each attending party. The primary purpose of the meeting is to review foreseeable methods and procedures related to roofing work.

## 1.6 Design Criteria

.1 General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

.2 Roofing System: to CSA-A123.21 for wind uplift resistance.

.3 Compatibility between components of system and adjacent materials is essential.
.1 Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.

1.7 Manufacturer's Inspections

.1 Report progress and quality of the work as observed. Progress reports must be published and distributed to all project stakeholders weekly.

.2 Provide periodic manufacturer's (minimum every other production day) roofing installation inspections: Inspections must include; photographic documentation of work in-progress and written statements of compliance with details/shop drawings.

.3 Report to the Owner and Consultant in writing any failure or refusal of the contractor to correct unacceptable practices called to the contractor's attention.

.4 Prior to commencement of roof membrane application, the manufacturer's roofing inspector shall review the installation of the insulation substrate including all tapered insulation to confirm that the finished roof system will have no flat or negatively sloped areas which will affect the performance of the roof or will adversely impact or void the roofing warranty.

.5 Confirm after project completion that the manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.8 Shipping, Handling and Storage

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

.2 Deliver and store materials undamaged in original containers with manufacturer's label and seals intact. All packed materials shall bear the manufacturer's name brand, and applicable specification number and printed instructions for storage and application. Materials not identified shall be removed off the site.

.3 The roofing contractor shall have adequate facilities or access to facilities to take receipt of and store roofing materials so that the materials are ready to be built in.

.4 Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

.5 All materials shall be protected from moisture at all times.

.6 Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation

manufacturer's written instructions for handling, storing, and protecting during installation.

.7 No material shall be placed in direct contact with the earth.

.8 Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 Environmental Requirements

.1 Apply roofing in periods only approved by the roofing inspector.

.2 Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

.3 Materials shall not be applied during inclement weather. Do not apply roofing over wet decks, or where frost or snow is present.

1.10 Protection

.1 Provide adequate protection of materials and work of this trade from damage by weather, Ultraviolet, traffic and other causes. At the end of each day's work seal exposed edges of roofing membrane. Protect work of other trades from damage resulting from the work of this trade. Make good such damage at no additional expense to the Owner and to the satisfaction of the Consultant.

.2 Protect adjacent properties and public areas in accordance with regulatory requirements and municipal by-laws.

1.11 Fire Protection

.1 Use of torch is prohibited.

.2 Protect roof junctions at parapets, roof curbs and upstands with a fire-resistant tape or barrier to prevent combustible materials within assemblies from ignition from any source.

.3 Use a heat detector gun to spot any smouldering or concealed fire at the end of each work day.

.4 Maintain a clean site and have one approved ABC fire extinguisher on each roof. All safety measures described in manufacturer's technical data sheets. All combustible or flammable products to be stored safely per manufacturer

recommendations.

1.12 Warranty

.1 Provide warranty backed by OIRCA and warrant the work of this Section against defects of workmanship and material, for a period of five (5) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Defects to include but not be restricted to leaking, failure to stay in place, undue expansion, lifting, deformation, loosening and splitting of seams, joint deformation, failure to adhere, deterioration, blisters, etc.

.3 Manufacturer's Extended Warranty: Provide manufacturers extended twenty (25) year warrantee to cover repair or replacement costs for labour, materials and workmanship required to restore roof or system to watertight condition, after a leak has occurred, due to defective materials or system related failures. Warranty shall be Non Pro Rated and must be covered to the original installation cost for the full twenty-five years from the date of Substantial Performance.

.4 Manufacturer Inspection and Preventative Maintenance Service:

.1 Scope: To report maintenance responsibilities necessary for preservation of Owner’s warranty rights and to perform periodic routine maintenance as required.
.2 Period: 2, 5, 10, 15 and 20 years from date of completion.

PART 2 PRODUCTS

2.1 Description - Roofing System

.1 Three ply SBS Composite felt cold-applied built-up conventional membrane roof system.

2.2 Performance Criteria

.1 Compatibility between components of system and adjacent materials is essential:

.1 Obtain components for roofing system from same Manufacturer as membrane roofing or manufacturer approved by membrane roofing Manufacturer.

.2 Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.

.2 Roofing System: to CSA A123.21 for wind uplift resistance. Contractor to ensure that the roof systems meet the design uplift pressures as shown on the drawings.

## 2.3 Sheeting

.1 Rip Proof Poly Sheeting, 6Mil.

## 2.4 Deck Sheathing

.1 Gypsum Roof Board: Fiberglass-faced prime gypsum board, minimum 12.7 mm thickness:

- .1 For wood and metal decks as specified.
- .2 Compressive Strength: Greater than 900 psi.
- .3 Fire Classification: UL 790 and 1256 certified, FM Class 1 approved.
- .4 Surface Water absorption: Less than 2.5 grams
- .5 Wind Uplift: Conform with Wind Uplift Pressures

## 2.5 Deck Primer

.1 Bitumen primer: water-based, polymer modified:

- .1 For wood and metal decks.
- .2 Volatile Organic Compounds (VOC): maximum, ASTM D3960, 2g/L.

.2 Bitumen primer: non-water-based, polymer modified:

- .1 For concrete decks.
- .2 Volatile Organic Compounds (VOC): maximum, ASTM D3960, 236g/L.

## 2.6 Vapour Retarder

.1 Self-Adhered:

- .1 Fiberglass reinforced, trilaminate woven polyethylene surface, SBS modified vapour control membrane.
- .2 Tensile strength: minimum ASTM D51417, 12.2kN/m.
- .3 Permeance: maximum ASTM E96, 0.02 perms.
- .4 Sealability to Nail: Pass ASTM D1970.

## 2.7 Insulation

.1 Base Insulation:

- .1 Description: closed cell polyisocyanurate, foam core laminated on both sides with inorganic glass reinforced facer. To ASTM C1289, Type II, Class I, Grade II (20 PSI).
- .2 Thickness: as noted on drawings.
- .3 Layers: as on drawings.

.2 Tapered Insulation:

.1 Description: closed cell polyisocyanurate, foam core laminated on both sides with inorganic glass reinforced facer. To ASTM C1289, Type II, Class I, Grade II (20 PSI).

.2 Backslope: As noted on drawings.

.3 Crickets: As noted on drawings.

.4 Drain Sumps: As noted on drawings.

.5 Scupper Sumps: As noted on drawings.

.3 Accessories:

.1 Insulation Adhesive:

.1 Description: urethane adhesive, bead-applied, low rise, two-component solvent-free, low-odour, formulated to adhere roof insulation to substrate.

.2 Flame spread index: ASTM E84: 10.

.3 Smoke developed index: ASTM E84: 30.

.4 Volatile Organic Compounds (VOC): maximum, ASTM D3960: 0g/L.

.5 Tensile Strength: minimum, ASTM D412: 1720kPa (250 psi).

.6 Peel adhesion: minimum, ASTM D903: 2.50kN/m (17 lbf/in).

.7 Flexibility @ 39°C: ASTM D816: pass.

.2 Fasteners:

.1 Description: factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening substrate board to roof deck.

.3 Tapered edge strips to ASTM C208, Type II, Grade I, cellulosic-fibre insulation board.

## 2.8 Coverboard

.1 To CAN/ULC-S706.1, Type 1-roof board, asphalt surface coated all six sides, 13 mm thick.

## 2.9 Membrane

.1 Ply Sheets:

.1 Description: SBS-modified asphalt coated composite polyester/fiberglass/fiberglass mat reinforced high tensile strength base sheet, ASTM D4601 Type II.

.2 Tensile strength at 25°C: minimum ASTM D5147: machine direction,28kN/m; cross machine direction26kN/m.

.3 Tear strength at 25°C: Minimum ASTM D5147: machine direction 1150N; cross machine direction 1120N.

.4 Thickness: minimum, ASTM D5147: 1.5 mm.

.5 Plies: 3.

.2 Membrane Flashing Sheets:

.1 Description: Thermoset elastomeric polyester reinforced sheet SBR modified Elastomeric Flashing Sheet.

.2 Breaking strength: minimum, ASTM D751: machine direction 1550N; cross machine direction 1330N.

.3 Tear strength: minimum, ASTM D751: machine direction 342N; cross machine direction 342N.

.4 Plies: 1.

.5 Elongation at failure: minimum, ASTM D751: machine direction 30%; cross machine direction 35%.

.6 Low temperature flexibility: minimum ASTM D2136: -40°C.

.7 Thickness: minimum, ASTM D751: 1.1 mm.

.3 Accessories:

.1 General: auxiliary materials recommended by roofing manufacturer for intended use and compatible with roofing membrane.

.2 Vertical Stripping Adhesive: single component roof elastomer.

.1

.2 Elongation @ 25°C: minimum, ASTM D412, 1000%.

.3 Flexibility @ 40°C: pass, ASTM D3111.

.3 Field Stripping Adhesive: fibrated roof mastic.

.4 Fasteners: factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening built-up roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing manufacturer.

.5 Miscellaneous: provide miscellaneous accessories as recommended by roofing manufacturer.

## 2.10 Adhesives

.1 General: adhesive and sealant materials recommended by roofing manufacturer for intended use and compatible with built-up roofing.

.1 Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

.2 Ply Sheet Adhesive:

.1 Description: Cold-applied roofing adhesive and surfacer, one-part, formulated for compatibility and use with specified roofing membranes and flashings.

.2 Volatile Organic Compounds (VOC): maximum, ASTM D6511: 250g/L.

.3 Non-volatile Content: minimum, ASTM D6511: 72%.

.3 Flashing Sheet Adhesive:

.1 Description: Single component, bitumen modified moisture curing polyurethane liquid applied roofing membrane/flashing adhesive.

.2 Low Temperature Elongation: Minimum, ASTM D412: 500%.

.3 Ultimate Elongation: Minimum, ASTM D412: 700%.

## 2.11 Surfacing

.1 Adhesive Surfacer:

.1 Description: Cold-applied roofing adhesive and surfacer, one-part, formulated for compatibility and use with specified roofing membranes and flashings.

.2 Volatile Organic Compounds (VOC): maximum, ASTM D6511: 250g/L.

.3 Non-volatile Content: minimum, ASTM D6511: 72%.

.2 Aggregate Surfacing Material:

.1 Description: 9mm to 15mm, 100% snow white calcite. Clean, well graded, no fines permitted.

.2 Basis of design: Snow White Calcite

.3 Coverage: 24kg/$m^2$.

## 2.12 Accessories

.1 General: auxiliary materials recommended by roofing manufacturer for intended use and compatible with roofing membrane.

.2 Angle Bracket Support: Model G-ABS with G-AFS aluminum flashing and rubber gasket
cap by Altra Metal Specialties Inc., or approved equal.

.3 Two-Component Spray-in-Place Polyurethane Foam Insulation: Confirm CAN/ULC-S705.1-01 and CAN/ULC-S705.2-98, as required and/or shown on the Drawings.

.4 Modified Bitumen Sealant: UV stable polyurethane sealant, modulus to CAN/CGSB -19.13-M87.

.5 Batt Insulation: At Built-Up Wood Curbs and Blocking: Mineral wool fibre, with density 40 kg/m3 (2.5 lb/ft3), thickness as specified and/or shown on the Drawings.

.6 Acoustic Insulation: Flute Filler-Acoustic Infill for perforated metal decks

.7 Metal Rust Primer: Acrylic metal primer formulated to protect steel from atmospheric corrosion.

.8 Metal Coating: Acrylic, elastomeric, tinted, fibrated metal coating.

.9 Gas Line Paint: Exterior grade oil based rust paint, colour: yellow.

.10 Polyurethane Caulking: UV stable polyurethane sealant, modulus to CAN/CGSB -19.13-M87.

.11 Cant strips to ASTM C208, Type II, Grade 1, cellulosic-fibre insulation board.

.12 Air Seal on Steel, Wood or Concrete Deck: Products or equivalent as specified in the Summary of Work and/or shown on the Drawings.

.13 Foam Gasket: Use 6mm thick by size shown on the Drawings,

.14 Vertical Flashing Fasteners: For Wood: No. 10 hot dip galvanized spiral nails. For Metal: Powers No. 12 “Deck Screws” with “Perma-Seal” coating. For Concrete, Brick or Masonry: Perma-Grip (Tru-Fast) “Tap-Grip” concrete screw with “Tru-Kote” coating, Powers “Tapper”concrete screw with “Perma-Seal” coating”, Powers “Roofing Spike” with “Perma-Seal”coating, or Powers “Zamac Nailin”. All fasteners to be 50 mm (2”) length with 25 mm (1”) hot dipped galvanized solid caps. Termination bar: 3 mm thick aluminum bar, 25 mm wide profile, pre-drilled for mechanical attachment.

.15 Reinforcing Mesh: Vinyl Coated, fiberglass reinforcing mesh.

.16 Sealant: UV stable polyurethane sealant, modulus to CAN/CGSB -19.13-M87.

.17 Self-adhering Membrane (Walls/Facia): Butyl based, composite vapour impermeable self-adhered membrane. Thickness: Min 18 mils.

.18 Pitch Pan Sealer: Two-part pitch pan sealer, 100% solids.

.19 Pitch Pan Filler: Quick set mortar.

## 2.13 Carpentry

.1 Refer to Section 06 08 99 - Rough Carpentry for Minor Works.

## 2.14 Flashing

.1 Refer to Section 07 62 00 – Sheet Metal Flashing and Trim.

## PART 3 EXECUTION

### 3.1 Quality Of Work

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual.

.3 Do priming in accordance with manufacturer's written recommendations.

.4 The interface of the walls and roof assemblies will be fitted with durable rigid material plywood providing connection point for continuity of air barrier.

.5 Assembly, component and material connections will be made in consideration of appropriate design loads.

### 3.2 Substrate Examination

.1 Verification of Conditions: inspect existing conditions including parapets, curbs, control/expansion joints, penetrations, and roof deck construction joints for damage and deterioration, if any found report to consultant before proceeding.

.2 Evaluation and Assessment: prior to beginning of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.

.2 Curbs have been built.

.3 Drains have been installed at proper elevations relative to finished roof surface.

.4 Plywood and lumber nailer plates have been installed to walls and parapets as indicated.

### 3.3 Protection Of In-Place Conditions

.1 Do not install roofing materials during rain or snow fall.

.2 Cover walls, walks and adjacent work where materials hoisted or used.

.3 Use warning signs and barriers:

.1 Maintain in good order until completion of work.

.4 Place sheeting over floors and equipment where underside of metal deck is exposed.

.5 Clean off drips and smears of bituminous material immediately.

.6 Dispose of rainwater off substrates and away from face of building until drains or hoppers installed and connected.

.7 Protect from traffic and damage.

.8 Place plywood runways over work to enable movement of material and other

traffic.

.9 At the end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

.10 Install insulation promptly to avoid the possibility of condensation beneath vapour retarder.

## 3.4 Deck Sheathing

.1 General:

.1 Comply with built-up roofing manufacturer's written instructions for installing deck sheathing.

.2 Commence installation at low points and/or at the drains. Shim boards solid at areas of deck deflections so that slope of finished surface is maintained.

.3 Butt boards with moderate contact and with edges bearing minimum of 38 mm on the top flange of the deck. Stagger end joints minimum 600 mm. Do not force it into place.

.4 Use 2400mm x 1200mm size sheets.

.5 Cut neatly at projections and points of termination.

.6 Replace all broken, damaged or misfit boards as work progresses. Lay only sufficient boards as can be covered by membrane roofing in the same work period.

.2 Installation:

.1 Install deck sheathing with adhesive or mechanically secure in-place as noted on the drawings.

.2 For fully adhered roof system, install deck sheathing with low rise foam adhesive to resist designed wind uplift pressures as per manufacturer’s written instructions at corner, edge and field locations. Unless otherwise recommended by the low-rise insulation adhesive manufacturer, designate one person to walk the boards into place and then roll the boards with a 150-lb roller. Apply weighted roller 5 –7 minutes after the initial adhesive application to ensure its proper placement.

.3 For partially mechanically secured roof system, install the deck sheathing with spot fasteners to keep deck sheathing in place until the first layer of base insulation is mechanically fastened to the roof deck. The installation of deck sheathing and first layer of base insulation be completed to resist designed wind uplift pressures as per manufacturer’s written instructions at corner, edge, and field locations.

## 3.5 Priming Deck

.3 Apply deck primer to roofing substrate at the rate specified on the container or apply primer to the existing vapour retarder if a decision is made to keep the existing vapour retarder in place.

## 3.6 Vapour Retarder

.4 General:

.1 Completely seal vapour retarder/air barrier at terminations, obstructions, and penetrations to prevent air movement into roofing system. Seal vapour retarder/air barrier to air barrier in adjacent construction at perimeter of roofing system.

.2 Adhere vapour retarder across substrate and extend vertically at all walls, curbs and parapets.

.3 Adhere vapour retarder as per manufacturer’s instructions.

## 3.7 Base Insulation

.5 General:

.1 Comply with built-up roofing manufacturer's written instructions for installing roof insulation.

.2 Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

.3 Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 6mm with insulation.

.4 Cut and fit insulation within 6mm of nailers, projections, and penetrations.

.5 Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 70 mm or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 150 mm in each direction.

.6 Ensure all insulation is applied free of damage, warp, or defect.

.7 Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

.8 Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

.6 Installation:

.1 Install insulation with adhesive or mechanically secure in-place as noted on the
drawings to resist designed wind uplift pressures as per manufacturer’s written
instructions at corner, edge and field locations.

.2 Unless otherwise recommended by the low-rise insulation adhesive manufacturer, designate one person to walk the boards into place and then roll the boards with a 150-lb roller. Apply weighted roller 5 –7 minutes after the initial adhesive application to ensure its proper placement.

## 3.8 Tapered Insulation

.1 Install tapered insulation in accordance with shop drawings:

.1 Stagger joints between layers 150 mm minimum.

.2 Install each layer of tapered insulation with adhesive to resist designed wind uplift pressures as per manufacturer’s written instructions at corner, edge and field locations.

.3 Unless otherwise recommended by the low-rise insulation adhesive manufacturer, designate one person to walk the boards into place and then roll the boards with a 150-lb roller. Apply weighted roller 5 –7 minutes after the initial adhesive application to ensure its proper placement.

## 3.9 Coverboard

.1 Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 150 mm in each direction. Loosely butt cover boards together.

.2 Install cover board with adhesive to resist designed wind uplift pressures as per manufacturer’s written instructions at corner, edge and field locations.

.3 Unless otherwise recommended by the low-rise insulation adhesive manufacturer, designate one person to walk the boards into place and then roll the boards with a 150-lb roller. Apply weighted roller 5 –7 minutes after the initial adhesive application to ensure its proper placement.

## 3.10 Cant Strips And Tapered Edge Strips

.1 Install cant strips at perimeter edges that terminate at vertical surfaces.

.2 Install tapered edge strips at perimeter edges that do not terminate at vertical surfaces.

.3 Set cant and tapered edge strips in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining in place. Adhesive to be applied in continuous ribbons applied 150 mm on centre.

## 3.11 Cold-Applied Built-Up Roofing Installation

.1 General:

.1 Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:

.1 Number of Ply Sheets: Three.

.2 Adhering Method: Cold-applied adhesive.

.3 Surfacing Type: A (aggregate).

.2 Start installation of built-up roofing in presence of manufacturer's technical personnel.

.3 Cooperate with testing agencies and personnel engaged or required to perform services for installing roofing.

.4 Contractor to remove the existing roof assembly to the limit of what can be reinstated by the end of day. New roof assembly to be installed to built-up membrane and membrane flashings by end of day. Membrane flashing upturns to include termination bars and sealant.

.5 Provide tie-offs at end of each day's work configured as recommended by NRCA Roofing Manual Appendix: Quality Control Guidelines - Insulation to protect new roofing.

.6 Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.

.7 Ensure plumbers plug is in place and drain is leak free until plumbing is complete. It is the responsibility of the contractor to drain the roof with temporary means while plumber’s plug is in place.

.8 Remove and discard temporary seals before beginning work on adjoining roofing.

.9 Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging built-up roofing components or adjacent building construction.

.2 Roofing Membrane Installation:

.1 Install lapped base-ply sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:

.1 Adhere to substrate in cold-applied adhesive applied at 2 gal/sq.

.2 Ply Sheets: Install ply sheets starting at low point of roofing. Align ply sheets without stretching. Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane. Shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.

.1 Embed each ply sheet in cold-applied membrane adhesive applied at rate required by roofing manufacturer (2gal/sq), to form a uniform membrane without ply sheets touching.

.3 Flashing and Stripping Installation:

.1 Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to built-up roofing manufacturer's written instructions and as follows:

.2 Unless otherwise shown on the drawings, extend base flashing up walls or parapets a minimum of 300 mm above built-up roofing and 150 mm onto field of built-up roofing.

.3 Prime substrates with asphalt primer if required by built-up roofing manufacturer.

.4 Flashing Sheet Application: Adhere flashing sheet to substrate in cold-applied adhesive.

.5 Vertical Terminations: Unless otherwise noted on the drawings, where flashing sheet terminates vertically, the flashing sheet must be secured with a termination bar and specified sealant prior to leaving site. All flashing sheets left terminated vertically without termination bar and Sealantwill need to be removed, moisture removed from system and reinstalled.

.6 Flashing Sheet Bottom Termination: Adhere flashing sheet to roofing membrane in continuous bed of cold-applied adhesive.

.7 Elastomeric Flashing Sheet: Heat weld vertical flashing joints. Seal bottom termination of base flashing by adhering to roofing membrane with cold-applied adhesive and sealing flashing-to-membrane joint with joint sealant.

.8 Install three course of stripping adhesive and reinforcing mesh at all vertical flashing seams. Install field stripping adhesive and reinforcing mesh at leading edge of flashing sheet.

.9 Flashing-Sheet Stripping: Install flashing-sheet stripping in a continuous coating of compatible mastic/adhesive sealer, as recommended by roofing manufacturer, and extend onto roofing membrane. Apply number of courses recommended by manufacturer.

.10 Roof Drains: Set flange in bed of vertical grade stripping adhesive and secure drain into place as per manufacturers written instructions. Install one base sheet 600 mm x 600 mm target patch, followed by a 900 mm x 900 mm flashing sheet target patch set in flashing adhesive. Tie in all leading edges with three course of stripping adhesive and reinforcing mesh.

.1 Install flashing sheet stripping according to roofing manufacturer's written instructions.

.11 Stack Flashings: Set flange in bed of vertical grade stripping adhesive and secure drain into place as per manufacturers written instructions. Install one base sheet 600 mm x 600 mm target patch, followed by a 900 mm x 900 mm flashing sheet target patch set in flashing adhesive. Tie in all leading edges with three courses of stripping adhesive and reinforcing mesh. Fill rubber boot with batt insulation and secure over aluminum body. Install clamping ring.

.12 B-Vents: Set flange in bed of vertical grade stripping adhesive and secure drain into place as per manufacturers written instructions. Install one base sheet 600 mm x 600 mm target patch, followed by a 900 mm x 900 mm flashing sheet target patch set in flashing adhesive. Tie in all leading edges with three courses of stripping adhesive and reinforcing mesh. Install rain collar with tooled caulking.

.13 Install self-adhering membrane to fully conceal exposed wood blocking on fascia of parapet walls.

.14 Curbs: Install flashing membrane to inside face of curb and extending 150mm onto the roof surface.

.4 Surfacing:

.1 Flood Coat and Aggregate Surfacing: Promptly after installing and testing roofing membrane, base flashing, and stripping, flood-coat roof surface with cold-applied adhesive surfacing adhesive applied at rate required by roofing manufacturer.

.1 While adhesive coating is fluid, cast aggregate surfacing in a uniform application at the average weight indicated in Part 2 product listing.

.2 Install safety railing as per manufacturer's instructions.

## 3.12 Field Quality Control

.1 Roofing Inspector: Owner will engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.

.2 Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at commencement and upon completion.

.1 Notify Consultant and Owner 48 hours in advance of date and time of inspection.

.3 Repair or remove and replace components of built-up roofing where test results or inspections indicate that they do not comply with specified requirements.

.1 Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

## 3.13 Protecting And Cleaning

.1 Protect built-up roofing from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Consultant and Owner.

.2 Correct deficiencies in or remove built-up roofing that does not comply with requirements, repair substrates, and repair or reinstall roofing to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

.3 Clean to Owner's approval, overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

.4 Check drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.

.5 Remove any and all bituminous staining to Owner's satisfaction.

.6 Waste Management: separate waste materials for reuse and recycling.

.1 Collect, package and store partly used or unused containers of asphalt, sealing compounds, primers and roofing felts for recycling, and return to recycler.

.2 Plan and coordinate insulation work to minimize generation waste.

.3 Give preference to suppliers who take back mineral fibre insulation waste for reuse or recycling.

.4 Place used hazardous sealant tubes, adhesive containers and materials defined as hazardous or toxic in designated containers.

.5 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.6 Ensure emptied containers are sealed and stored safely.

.7 Divert unused aggregate materials from landfill to local quarry or facility for reuse.

.8 Unused coating material must be disposed of at official hazardous material collections site.

.9 Unused adhesive, sealant and asphalt materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.10 Dispose of unused adhesive material at official hazardous material collections site.

.11 Dispose of unused asphalt material at official hazardous material collections site.

.12 Divert unused gypsum materials from landfill to recycling facility.

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 07 51 00 Built up Bituminous Roofing
.2 Section 07 71 00 Roof Specialties and Accessories
.3 Section 06 10 00 Rough Carpentry
.4 Section 07 92 00 Joint Sealants

## 1.3 References

.1 Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual.
.2 ASTM International (ASTM)
  .1 ASTM A653/A653M-20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM D523-14 Standard Test Method for Specular Gloss
.3 Canadian Standards Association (CSA):
  .1 CSA B111 Wire Nails, Spikes and Staples.
.4 Canadian General Services Board (CGSB):
  .1 CAN/CGSB 1.108-M Bituminous Solvent Type Paint.
  .2 CAN/CGSB-37.5 Cutback Asphalt Plastic Cement.
  .3 CAN/CGSB-51.32 Sheathing, Membrane, Breather Type.
.5 Canadian Sheet Steel Building Institute (CSSBI):
  .1 CSSBI - Standard Practice for Sheet Steel Cladding.
  .2 CSSBI 20M-91 Sheet Steel Cladding for Architectural and Industrial Applications.
  .3 CSSBI B16-94 Prefinished Sheet Steel for Building Construction.

## 1.4 Submittals

.1 Submit duplicate 12” x 12” samples of each type of sheet metal material, colour and finish when requested by the Consultant.

.2 Submit WHMIS Safety Data Sheets for all products intended to be used, including adhesives and sealants.

## 1.5 Design and Performance Requirements

.1 Appearance: neatly and evenly lay out and install components. Exposed fastening devices not permitted.

.2 Effects of Wind: resist positive and negative wind pressures without detrimental effects.

.3 Water Control: prevent passage of water.

.4 Thermal Movement: accommodate expansion and contraction of component parts without buckling, failure of joints, undue stress on fasteners and other detrimental effects.

.5 Compatibility: components shall be compatible with dissimilar metals and materials with which they are in contact or fastened to so as to prevent corrosion, staining and other detrimental effects. If required, treat or separate contact surfaces with inert and non-staining insulation material to achieve compatibility.

1.6 Quality Assurance

.1 Work of this Section shall be performed by a qualified sheet metal contractor with a minimum of 5 years of experience in the type of work required and specified. Submit proof of experience where requested by the Consultant.

1.7 Shipping, Handling and Storage

.1 Materials shall be handled and stored on the job in such a manner that no damage shall be done to the material or the structures.

.2 Materials showing evidence of improper handling and storage shall be rejected and removed from the site at no additional expense to the Owner.

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of 2 years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Submit manufacturer’s warrantee that pre-finished materials will not lose film integrity for 25 years and will not chalk or fade for 20 years following date of Substantial Performance.

PART 2 PRODUCTS

2.1 General

.1 Ensure compatibility of all materials in contact with roof membrane.

2.2 Materials

.1 Sheet Metal: 24 gauge (0.61 mm) thick galvanized sheet steel, commercial quality to ASTM A653 Grade 'A' with a minimum yield stress of 230 MPA, and a working stress of 144 MPA, to CSA 136. Material shall have Z275 designation zinc coating.

.2 Prefinished material shall be colour coated with manufacturer’s standard finish system equivalent to VicWest Colourite HMP with 100% ceramic colour pigmentation, minimum dry film thickness of 1.0 ± 0.2 mils (ASTM D1005). This Section shall supply all metal

flashing for all roof and wall applications whether shown or not, and as necessary for the complete installation.

.1 Colour for all sheet metal flashing and trim shall be as selected by the Consultant from full range of manufacturer's standard colours.

.2 Colours will be selected and determined for each school .

.3 Continuous hook on strips and metal bellows: 22 gauge (0.65 mm) galvanized sheet steel, zinc coating designation ZF275.

.4 Isolation Coating: Alkali resistant exterior bituminous paint to CAN/CGSB 1.108-M.

.5 Plastic Cement: To CAN/CGSB 37.5.

.6 Nails, Bolts, Screws and Other Fastenings: same metal finish as sheet metal being used to CSA B111. The size of fastenings shall suit the applicable conditions.

.7 Underlay: No. 15 perforated asphalt felt to CSA A123.3-M or dry sheathing, breather type, to CAN/CGSB-51.32

.8 Cleats: Of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

PART 3 EXECUTION

3.1 General

.1 Install sheet metal work in accordance with CRCA specifications and as detailed.

.2 Use concealed fastenings except where approved before installation.

3.2 Fabrication

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA specifications and as indicated.

.2 Form pieces in 8'-0" maximum lengths.

.3 Hem exposed edges on underside ½". Mitre and seal corners with sealant.

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

.5 Apply isolation coating (two coats) to metal surfaces to be in contact with concrete or mortar or dissimilar metals.

.6 Install underlay under sheet metal in accordance with CRCA "FL" series details. Lap joints 4".

.7 All seams shall be of the "slip lock type" that permit adequate movement without resulting in deformation or loosening of metal flashings. Lapped joints or exposed raw edges will not be accepted. Exposed edges shall be "double back" at least ½". At eaves and parapets, metal shall be hooked over continuous starter strips minimum 1 gauge thicker than the metal used for flashing. Secure starter strips at 1'-0" on centre or closer as required.

.8 Where metal terminates under fascia boards, secure metal at 2'-0" centres using specified fasteners. At curbs to openings or at sleepers, provide locked or standing seams at corners. Solder mitred corners, pop rivet or form standing seams.

.9 Secure metal flashings in reglets at 2'-0" centres and further secure metal to vertical surfaces at locks as required.

.10 All flashings shall be installed in perfectly straight lines. Irregular or badly fitted work will not be accepted. Exposed fastenings will only be permitted where concealed fastening is not possible. Provide neoprene washers for exposed fasteners.

.11 Imperfections in metal flashing work such as holes, dents, creases, or oil-canning will not be accepted.

3.3 Caulking of Flashings

.1 Sealants shall be as specified in Section 07 92 00 - Joint Sealants.

.2 Caulk all joints in flashing.

.3 Dissimilar metals in contact, or metals in contact with adjacent surfaces shall be separated from one another to prevent corrosion, staining, or electrolysis by use of approved methods and materials.

.4 Do caulking between metal flashing and concrete.

.5 Caulking compound shall be applied in strict accordance with the manufacturer's application instructions. Use proper surface primers where necessary.

.6 Colour of caulking compound shall be the integral colour of the abutting material.

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 51 00 Built up Bituminous Roofing
.3 Section 07 62 00 Sheet Metal Flashing and Trim
.4 Section 07 92 00 Joint Sealants

## 1.3 References

.1 Canadian Standards Association (CSA)
  .1 CSA A231.1-14/A231.2-14 - Precast Concrete Paving Slabs/Precast Concrete Pavers
  .2 CSA B272-93 (R2000), Prefabricated Self-Sealing Roof Vent Flashings

## 1.4 Submittals

.1 Submit shop drawings and manufacturers literature:
  .1 Indicate size and description of components and materials, arrangement of hardware, operating mechanism, required clearances, fasteners, anchoring, and finishes.
  .2 Shop drawings for roof barrier guardrail systems: Indicate profiles, sizes, connections, size, and type of fasteners and accessories.
    .1 Shop drawings for roof barrier guardrail system shall be stamped by a professional engineer registered in the Province of Ontario.

## 1.5 Shipping, Handling and Storage

.1 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.
.2 Do not store roof pavers in piles or on pallets on roof.

## 1.6 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two (2) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

# PART 2 PRODUCTS

## 2.1 Materials

.1 Stack jacks Thaler S1-31 insulated vandal proof sleeve vent stack covers with standard mill finish with perforated collar or approved equal. Rubber sleeves and sleeves supplied by other trades will not be acceptable.

## PART 3 EXECUTION

### 3.1 Mechanical Vent Flashings

.1 Co-ordinate size, material, and locations with Mechanical Sections. Provide mechanical vent flashings at all mechanical equipment and pipe penetrations through the roof.

.2 Flashings shall be compatible with roofing assemblies.

.3 Install vent flashings and other penetration flashings and seal to roof membrane in accordance with manufacturer's recommendations and details.

.4 Secure all vent flashings and accessories to deck with bolts to meet the manufacturer's specifications.

.5 Coordinate with other trades for location and size of vent flashings.

### 3.2 Mechanical Vent Flashings

.1 For all connections with clamp fittings, each set screw is to be tightened to 20 ft.lbs. of torque.

.2 Placement of uprights and weighted base plates to meet manufacturer specifications as stated in the manufacturer’s Installation Instructions.

.3 Terminate each run as stated in the manufacturer’s Installation Instructions.

.4 Schedules:

.1 Freestanding counterweighted guardrail system with 1095 mm nominal height to be used as a guardrail where maintenance personnel are exposed to any falling hazards that resists an evenly distributed vertical load of 1.5kN/m applied at the top of the guard (As per the National Building Code of Canada)

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 07 92 00 Joint Sealants
.2 Section 09 21 16 Gypsum Board

## 1.3 References

.1 Ontario Building Code
.2 Underwriter's Laboratories of Canada (ULC)
  .1 CAN/ULC S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials
  .2 CAN/ULC S102.2-10, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
  .3 CAN/ULC S115-11, Standard Method of Fire Tests of Firestop Systems
.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).
.4 South Coast Air Quality Management District (SCAQMD) California State
  .1 SCAQMD Rule 1168-03: Adhesives and Sealants.

## 1.4 Submittals

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

.2 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  .2 Submit two (2) copies of WHMIS MSDS - Material Safety Data Sheets.

.3 Shop Drawings:
  .1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.
  .2 Construction details should accurately reflect actual job conditions.

.4 Samples:
  .1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.

.5 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  .1 Test reports: in accordance with CAN/ULC-S101-07 for fire endurance and CAN/ULC-S102-10 for surface burning characteristics.
  .2 Submit certified test reports from approved independent testing laboratories, indicating

compliance of applied fire stopping with specifications for specified performance characteristics and physical properties

.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 Definitions

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

1.6 Quality Assurance

.1 One installer shall install all firestopping on the project. Each trade shall not firestop their own service penetrations. Installer shall be certified by fire stopping manufacturer.

.2 Qualifications:
.1 Qualified Installer: specializing in fire stopping installations with 5 years documented experience approved and trained by manufacturer.

.3 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant to:
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Co-ordination with other building subtrades.
.4 Review manufacturer's installation instructions and warranty requirements.

.4 Site Meetings:
.1 As part of Manufacturer's Services described in 3.5- Field Quality Control, schedule site visits, to review Work, at stages listed.
.2 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
.3 Twice during progress of Work at 25% and 60% complete.
.4 Upon completion of Work, after cleaning is carried out.
.5 Single Source Responsibility: Obtain through-penetration fire-stop systems for each kind of penetration and construction condition indicated from a single manufacturer.

.5 Field-Constructed Mockup: Prior to installing fire-stopping, erect mockups for each

different through-penetration fire-stop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.

.1 Locate mockups on site in locations indicated or, if not indicated, as directed by Consultant.
.2 Notify Consultant one (1) week in advance of the dates and times when mockups will be erected.
.3 Obtain Consultant's acceptance of mockups before start of final unit of Work.
.4 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.
.5 Accepted mockups in an undisturbed condition at time of Substantial Performance may become part of completed unit of Work.

1.7 Sustainable Requirements

.1 Materials shall be Low VOC type conforming to SCAQMD Rule 1168-03. Maximum VOC level of firestopping materials shall be 250 g/l.

1.8 Shipping, Handling and Storage

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

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

.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.4 Storage and Protection:
.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

1.9 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 All fire stopping shall consist of ULC listed firestop system.
.2 All firestopping material shall be:
.1 From one manufacturer;
.2 Intumescent where an appropriate system exists.

.3 Fire stopping and smoke seal systems: ULC listed in accordance with CAN/ULC S115-11.

.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN/ULC-S115-11 and not to exceed opening sizes for which they are intended.

.4 Service penetration assemblies: ULC listed systems tested to CAN/ULC-S115-11.

.5 Service penetration fire stop components: ULC listed and certified by test laboratory to CAN/ULC-S115-11.

.6 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.7 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.8 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.9 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.10 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.11 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.12 Sealants for vertical joints: non-sagging.

.13 General: Provide fire-stopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

.14 F-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with F ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

.15 T-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with T ratings, in addition to F ratings, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupy-able floor areas. T-rated assemblies are required where the following conditions exist:
- .1 Where fire-stop systems protect penetrations located outside of wall cavities.
- .2 Where fire-stop systems protect penetrations located outside fire-resistive shaft enclosures.
- .3 Where fire-stop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
- .4 Where fire-stop systems protect penetrating items larger than a 100 mm diameter nominal pipe or 10,000 mm² in overall cross-sectional area.

.16 Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated,

but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

.17 For fire-stopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
- .1 For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration fire-stop systems.
- .2 For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide fire-stop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
- .3 For penetrations involving insulated piping, provide through-penetration fire-stop systems not requiring removal of insulation.

.18 For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450.

.19 Compatibility: Provide fire-stopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by fire-stopping manufacturer based on testing and field experience.

.20 Accessories: Provide components for each fire-stopping system that are needed to install fill materials and to comply with "System Performance Requirements". Use only components specified by the fire-stopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance-rated systems. Accessories include but are not limited to the following items:
- .1 Permanent forming/damming/backing materials including the following:
  - .1 Semi-refractory fibre (mineral wool) insulation.
  - .2 Ceramic fibre.
  - .3 Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
  - .4 Fire-rated formboard.
  - .5 Joint fillers for joint sealants.
- .2 Temporary forming materials.
- .3 Substrate primers.
- .4 Collars.
- .5 Steel sleeves.

.21 Applications: Provide fire-stopping systems composed of materials specified in this Section that comply with system performance and other requirements.

.22 Environmental Conditions: Do not install fire-stopping when ambient or substrate temperatures are outside limits permitted by fire-stopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

.23 Ventilation: Ventilate fire-stopping per fire-stopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

.24 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials and regarding labeling and provision of Material Safety Data Sheets (MSDS).

## PART 3 EXECUTION

### 3.1 Manufacturer's Instructions

.1 Compliance: comply with manufacturer's written recommendations or specifications.

### 3.2 Preparation

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.2 Ensure that substrates and surfaces are clean, dry and frost free.

.3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.4 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour retarder

.5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

### 3.3 Installation

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing and as necessary to maintain fire resistance ratings of floor and wall assemblies.

.2 Provide fire stopping for all disciplines.

.3 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.4 Fill spaces between openings, ducts, pipes and unused sleeves passing through fire separations with firestop material and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.

.5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.6 Tool or trowel exposed surfaces to neat finish.

.7 Remove excess compound promptly as work progresses and upon completion.

3.4 Sequences of Operation

.1 Proceed only when submittals have been reviewed by Consultant.

.2 Mechanical pipe insulation: certified fire stop system component.
.1 Ensure pipe insulation installation precedes fire stopping.

3.5 Field Quality Control

.1 Inspections: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.2 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site.

.3 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1.4 - SUBMITTALS.
.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
.3 Schedule site visits, to review Work, as directed in PART 1.6 - QUALITY ASSURANCE.

3.6 Commissioning

.1 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site. Submit DRI's written reports within 3 days of review, verifying compliance of Work.

.2 Perform a thorough examination of the fire stopping system to determine if the assembly is installed as per its ULC listing.

.3 Allow for destructive testing of installed firestopping. Repair all tested assemblies.

.4 The examination shall take place prior to close-up to confirm assembly components and installation configuration.

.5 Any and all deviations from the ULC listed system shall be considered grounds for rejection and replacement.

3.7 Schedule

.1 Fire stop and smoke seal at:
.1 Penetrations through fire-resistance rated concrete, masonry, and gypsum board partitions and walls.
.2 Top of fire-resistance rated partitions.

.3 Intersection of fire-resistance rated partitions.
.4 Control and sway joints in fire-resistance rated partitions and walls.
.5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
.6 Around mechanical and electrical assemblies penetrating fire separations.
.7 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
.8 All electrical outlet boxes installed in fire rated gypsum board assemblies.
.9 All locations required by the Ontario Building Code.
.10 Any other locations indicated

3.8 Cleaning

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

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 51 00 Built up Bituminous Roofing
.3 Section 07 62 00 Sheet Metal Flashing and Trim

## 1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C834-14 Standard Specification for Latex Sealants
  .2 ASTM C920-14a Standard Specification for Elastomeric Joint Sealants
  .3 ASTM C1193-13 Standard Guide for Use of Joint Sealants
  .4 ASTM C1311-14 Standard Specification for Solvent Release Sealants
.2 Canadian General Standards Board (CGSB)
  .1 CGSB 19.13-M, Sealing compound, one component, elastomeric chemical curing.
  .2 CGSB 19-GP-14M Sealing compound, one component, butyl-polyisobutylene, polymer base, solvent curing.
  .3 CAN/CGSB-19.24-M90, Multi component, chemical curing sealing compound.
.3 South Coast Air Quality Management District (SCAQMD) California State
  .1 SCAQMD Rule 1168-03: Adhesives and Sealants.

## 1.4 Submittals

.1 Submit product data for all sealant materials and accessories.

.2 Submit MSDS Data Sheets for review and acceptance by the Owner prior to delivery to the project site. Obtain written approval from the Owner and do not deliver any materials to the Owner’s property, prior to receipt of such approval.

## 1.5 Quality Assurance

.1 Installation of caulking shall be performed only by workmen thoroughly skilled and specially trained in the techniques of caulking.

.2 Caulking work shall be carried out in strict accordance with manufacturer's printed directions.

## 1.6 Shipping, Handling and Storage

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

.2 Use all means necessary to protect caulking materials before, during and after installation and to protect the installed work and materials of all other trades.

.3 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.

.4 Store all caulking materials and equipment under conditions recommended by its manufacturer.

.5 Do not use materials stored for a period exceeding the maximum recommended shelf-life of the material.

.6 Materials shall be delivered to the job in their original containers or wrapping with the manufacturer's seal and labels intact.

1.7 Environmental Considerations

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

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work by use of approved portable supply and exhaust fans.

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of three (2) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

## PART 2 PRODUCTS

2.1 Materials

.1 Primers: Type recommended by sealant manufacturer. Low VOC type

.2 Joint Fillers:
- .1 General: Compatible with primers and sealants, outsized 30 to 50%.
- .2 Vertical Joints: Polyethylene, Urethane, Neoprene or Vinyl:
  - .1 Extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
  - .2 Sealtight-Etha Foam Backer Rod, W. R. Meadows Canada Ltd. or equal.
- .3 Horizontal Joints: Neoprene or Butyl Rubber (Horizontal Joints): Round solid rod, Shore A hardness 70.

.4 Premoulded Joint Filler: Unifoam R1009, Goodco Limited or equal.

.3 Sealants:
.1 All sealants shall be Low VOC Type.
.2 Colour of sealants to be selected by Consultant.
.3 For Exterior Locations: To ASTM C920-14a, two component LP polysulphide base sealant Type 2 where subjected to foot traffic and Type 1 where not subjected to foot traffic (20-35 Shore A) Class B, bearing seal of approval of Thiokol Chemical Corporation.

.4 Bond Breaker Tape: Polyethylene bond breaker tape which will not bond to sealant.

.5 Joint Cleaner: Xylol, methylethyleketon or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

## PART 3 EXECUTION

### 3.1 Inspection

.1 Inspect conditions and substrates upon which work of this Section is dependent. Report to Consultant in writing any defects that may jeopardize the performance of this work.

.2 Commencement of work implies acceptance of conditions.

### 3.2 Preparation

.1 Remove dust, loose mortar and other foreign matter. Ensure joint surfaces are dry and free of frost.

.2 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

.3 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.

.4 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.5 Prepare concrete and masonry surfaces to sealant manufacturer's instructions.

.6 Examine joint sizes and conditions to achieve correct depth ratio ½ of joint width with minimum width and depth of 6 mm, maximum width 25 mm.

.7 Install joint filler to achieve correct joint depth.

.8 Where necessary to prevent staining, mask adjacent surface prior to priming and caulking.

.9 Apply bond breaker tape where required to ensure performance of sealant.

.10 Prime sides of joints when required and as recommended by sealant manufacturer to ensure performance of sealant immediately prior to caulking.

3.3 Application

.1 Apply sealants in accordance with manufacturer's instructions, in continuous beads, to provide watertight joint. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.2 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave joint.

.3 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.

.4 Apply sealant to joints between window or door frames to adjacent building components, around perimeter of every external opening, to control joints in masonry walls where shown.

.5 Caulk joints in surfaces to be painted before surfaces are painted. Where surfaces to be caulked are primed in shop before caulking, check to make sure prime paint and caulking are compatible. If they are incompatible, inform Consultant and change caulking to compatible type approved by Consultant.

3.4 Schedule

.1 Provide sealants at the following locations
.1 Where required to protect interior from exterior air and water infiltration.
.2 Joints between all dissimilar materials.
.3 Other locations where caulking or sealant is required to provide a neat clean junction
l

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 84 00 Firestopping
.3 Section 07 92 00 Joint Sealants
.4 Section 09 22 16 Non-Structural Metal Framing
.5 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C514-04(2020) Standard Specification for Nails for the Application of Gypsum Board
  .2 ASTM C840-20 Standard Specification for Application and Finishing of Gypsum Board
  .3 ASTM C954-22 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
  .4 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
  .5 ASTM C1047-19 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
  .6 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  .7 ASTM C1178/C1178M-18 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
  .8 ASTM C1278/C1278M-17 Standard Specification for Fiber-Reinforced Gypsum Panel
  .9 ASTM C1280 - 18 Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
  .10 ASTM C1288-17 Standard Specification for Fiber-Cement Interior Substrate Sheets
  .11 ASTM C1325-22 Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units
  .12 ASTM C1396/C1396M - 17 Standard Specification for Gypsum Board
  .13 ASTM C1629/C1629M-19 Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
  .14 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .15 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
  .16 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
.2 American National Standards Institute (ANSI)
  .1 ANSI A118.9-1992 Test Methods and Specifications for Cementitious Backer Units.
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  .2 CAN/CGSB 19-GP-21M Sealing and Bedding Compound for Acoustical Purposes
.4 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  .2 ULC 114-2018 Standard Method of Test for Determination of Non-Combustibility in Building Materials
  .3 ULC 129- 2015 Standard Method of Test for Smolder Resistance of Insulation (Basket Method)

.4 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
.5 Gypsum Association (GA)
.1 GA-214-2022 Recommended Levels of Gypsum Board Finish.
.2 GA-216-2021 Application and Finishing of Gypsum Board.
.3 GA-253-2021 Application of Gypsum Sheathing
.6 Wall and Ceiling Bureau (WCB)
.1 Technical Bulletin Control Joint Placement in Gypsum Board Assemblies

1.4 Submittals

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.

1.5 Quality Assurance

.1 Dry wall installers: minimum 5 years proven experience.

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.5 Mock-Ups
.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
.2 Construct mock-up gypsum board wall installation including one inside corner and one outside corner. Mock-up may be part of finished work.
.3 Allow two working days for inspection of mock-up by Consultant before proceeding with rest of the work.
.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.6 Design Requirements

.1 Where indicated provide minimum sound transmission rating of installed partitions of STC 50 tested to ASTM E90.

.2 Provide fire resistance rating of installed partitions as indicated and according to referenced ULC design.

1.7 Shipping, Handling and Storage

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

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

.3 Protect gypsum board materials before, during and after installation and to protect the installed work and materials of other trades affected by this work. Store materials in a dry area inside the building. Do not remove wrapping until ready for use. Prevent damage to all edges and surfaces.

1.8 Project Conditions

.1 Maintain temperature minimum 10 ° C, maximum 21 ° C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.9 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Gypsum Board

.1 To ASTM C1396/C1396M. Standard for non-rated applications, Type X for rated applications, 1220 mm wide x maximum practical length, ends square cut, edges tapered with round edge, 12.7 mm thick or to thickness indicated on drawings. All fire rated board shall be minimum 16 mm thickness.

.2 Abuse Resistant Gypsum Board: CGC Fibrerock abuse resistant fibre/gypsum panels, 16 mm thickness.

.3 Water and Moisture Resistant Board: to ASTM C1396, 12.7 mm thick, 1220 mm wide with tapered edges.

.4 Glass Mat Water-Resistant Gypsum Board: to ASTM C1178 with glass mat facings, both sides, regular and Type X, thicknesses as indicated on drawings, 1200 mm wide x maximum practical length, ends square cut, long edges tapered.

.5 Glass Mat Exterior Gypsum Sheathing: to ASTM C1177, 12.7 mm thick, 1219 mm wide x 2440 mm long, square edge.
- .1 Weight: 9.27 kg/$m^2$
- .2 Surfacing: Fiberglass mat on face, back, and long edges.
- .3 Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
- .4 Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
- .5 Humidified Deflection (ASTM C1177): Not more than 6.0 mm.
- .6 Permeance (ASTM E96): Not less than 23 perms.
- .7 R-Value (ASTM C518): 0.56.
- .8 Mold Resistance (ASTM D3273): 10, in a test as manufactured.
- .9 Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.

2.2 Cementitious Backer Board

.1 Cementitious backer board: cementitious, water durable, board; surfaced with fiberglass reinforcing mesh on front and back; long edges wrapped; to ANSI A118.9, ASTM C1288 and ASTM C1325, 13 mm thick, edges tapered, 1200 mm wide x maximum practical length. Compressive strength: Not less than 15.51 MPa when tested in accordance with ASTM D2394. Water absorption: Not greater than 8 percent when tested for 24 hours in accordance with ASTM C473.

2.3 Fastening and Adhesives

.1 Drywall Screws: To ASTM C954 or ASTM C1002 self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

.2 Sheathing Screws: To ASTM C1002, corrosion resistant, heat treated self-tapping sheet metal screws minimum 32 mm long.

.3 Joint Tape: To ASTM C475, 50 mm perforated with preformed seam, mould and mildew resistant.
.1 Joint tape for abuse resistant gypsum board: CGC Mould Resistant Fiberglass Drywall Tape.

.4 Joint Filler and Topping: To ASTM C475 vinyl or latex base, slow setting.

.5 Joint Treatment for Gypsum Sheathing: 50 mm wide, 10 x 10 woven threads per 25 mm, self-adhering fibreglass joint tape and Borden HPPG Elmer's Siliconized Acrylic Latex Caulk.

.6 Laminating Compound: as recommended by manufacturer, asbestos-free.

2.4 Acoustic Insulation

.1 Acoustic Attenuation: Min 50 STC in accordance with ASTM E90.

.2 Acoustic Insulation: Mineral or Glass Fibre Acoustic Insulation:
.1 Mineral Fibre Acoustic Insulation: To ASTM C665, Mineral fibre blanket insulation, minimum density of 40 kg/$m^3$:
.2 Glass Fibre Acoustic Blanket Insulation: To CAN/ULC-S702, type 1, pre-formed unfaced glass fibre batt acoustic insulation.

.3 Surface burning characteristics to ULC 102:
.1 Flame spread: 15
.2 Smoke developed: 5
.3 Smoulder resistance: to ULC 129.
.4 Non-combustible: to ULC 114

.4 Thickness to suit depth of wall framing and as indicated.

.5 Acoustic sealant: as specified in Section 07 92 00 - Joint Sealants.

2.5 Accessories

.1 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.

.2 Insulating Strip: Rubberized, moisture resistant, 3.0 mm thick, 12 mm wide closed cell neoprene

strip, with self-sticking permanent adhesive on one face; lengths as required.

.3 Sealants: as specified in Section 07 92 00 - Joint Sealants.

PART 3 EXECUTION

3.1 General

.1 Prior to installation of gypsum wallboard, ensure that all required vapour barriers, air seals, gaskets and the like installed under another Section have been inspected and accepted by Municipal authorities and the Consultant. Failure to do so will result in removal of all gypsum board installed prior to approval and replacement, at no additional cost to the Owner.

.2 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

3.2 Acoustic Insulation

.1 Install acoustic blankets full width and length, with tight joints, between wall framing and around penetrating electrical service boxes, piping, air ducts and frames.

.2 Place acoustic blankets where indicated on the Drawings and to thickness required to obtain acoustic performance indicated for the assembly.

.3 Place acoustic blankets between studs ensuring friction fit, free of sags, folds or open joints that may let sound pass through.

.4 Install blankets from the bottom up, tightly adjusted and trim accurately with a utility knife.

3.3 Gypsum Board Application

.1 Do application and finishing of gypsum board in accordance with ASTM C840 and/or GA-216 except where specified otherwise.

.2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.

.3 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.

.4 Install fibre gypsum abuse resistant panels at all ceilings and bulkheads except as noted below. Treat joints with fibreglass reinforced joint tape in accordance with manufacturer’s instructions.

.5 Apply water or moisture resistant gypsum wallboard where indicated. Apply water resistant sealant to edges, ends and cut outs which expose gypsum core.

.6 Install Hi-Density Water Resistant Gypsum Sheathing in showers and other wet areas.

.7 Carry gypsum board from floor to underside of floor or roof structure above. Furr out and carry gypsum board around any structural members as may be required. Neatly cope gypsum board to fill deck flutes where gypsum board abuts floor or roof deck.

3.4 Gypsum Sheathing

.1 Install in accordance with GA-253, ASTM C1280 and manufacturer's recommendations.

.2 Install exterior gypsum sheathing horizontally on all exterior walls where indicated. Stagger joints between adjacent sheets.

.3 Screw-attach gypsum sheathing to each stud with 32 mm self-drilling corrosion resistant sheathing screws spaced 10 mm from ends and edges 200 mm o.c. Drive fasteners to bear tight against and flush with surface of sheathing. Do not countersink. Apply sealant around sheathing perimeter at interface with other materials and install flashing as indicated on the drawings.

.4 Apply fibreglass joint treatment to all joints, overlapping at intersections by the width of the tape. Apply 10 mm bead of sealant along the joint and embed the sealant into the entire surface of the tape with a trowel. Apply enough sealant to each exposed fastener to cover completely when trowelled smooth.

3.5 Cementitious Backer Board

.1 Install cementitious backer board where indicated in shower and tub enclosures and other wet areas indicated.

.2 Install in accordance with manufacturer's instructions.

3.6 Accessories

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.

.2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.3 Install insulating strips continuously at edges of gypsum board or casing beads abutting exterior door or window frames, to provide thermal break.

.4 Install continuous bead of acoustic sealant at all penetrations through sound control partitions.

.5 Provide control joints in gypsum board facing. Construct control joints in accordance with ASTM C840 and as described in Wall and Ceiling Bureau Technical Bulletin "Control Joint Placement in Gypsum Board Assemblies". Place control joints consistent with lines of building spaces as indicated. Where not indicated install as directed at maximum 6.0 m spacing. Control joints shall be supported with metal studs or furring channels on both sides of the joint Construct joints using back-to-back casing beads filled with a low modulus sealant capable of flexible joint movement. Maintain fire-resistance rating of wall assemblies. Control joints shall be provided:
   .1 At abutting structural elements, steel columns.
   .2 At expansion or control joints in the substrate.
   .3 At each door jamb.

3.7 Access Doors

.1 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.2 Rigidly secure frames to furring or framing systems, to satisfy fire rating requirements.

3.8 Taping and Filling

.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces. Finish to GA-214 Level 5.

.2 Finish corner beads, control joints and trims as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.9 Cleaning

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

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 09 21 16 Gypsum Board

## 1.3 References

.1 ASTM International (ASTM).
  .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM C645-18 Standard Specification for Nonstructural Steel Framing Members
  .3 ASTM C754-20 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
  .4 ASTM C841-03(2018) Standard Specification for Installation of Interior Lathing and Furring.
  .5 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
  .6 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .7 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
  .8 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
.2 Canadian General Services Board (CGSB).
  .1 CAN/CGSB-1.40-97 Primer, Structural Steel, Oil Alkyd Type.
.3 Underwriters Laboratories of Canada (ULC)
  .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
.4 CSSBI Lightweight Steel Framing Manual

## 1.4 Submittals

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

.2 Product Data:
  .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.

## 1.5 Quality Assurance

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

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

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

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Metal Stud Framing Systems

.1 Non-load bearing channel stud framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
  .1 Thickness of materials to conform to referenced standards unless noted otherwise.
  .2 Thickness of materials shall be selected from manufacturer’s standard span tables to suit total height requirements.

.2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

.3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.

.4 Tie Wire: 0.90 mm, galvanized, soft annealed, steel wire or clip as recommended by the manufacturer of furring channels.

.5 Wind bearing light weight steel stud framing for exterior wall applications is specified in Section 05 41 00.

2.2 Metal Furring and Suspension Systems

.1 Channel framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board.

.1 Thickness of materials to conform to referenced standards unless noted otherwise.

.1 Metal Furring Runners, Hangers, Tie Wires, Inserts, Anchors: to ASTM C645 , electro-zinc coated steel.

.2 Runner Channels: 38 x 19 x 0.59 mm and 38 x 9.5 x 0.45 mm, hot dip or electro-galvanized sheet steel. Use of various sizes governed by applied loads and applicable spans.

.3 Drywall Furring Channel: Channel shaped furring member for screw attachment of drywall with knurled face. For interior use. Furring masonry or concrete surfaces. Cross furring under steel joist or suspended metal channels in suspended ceiling systems: 70 x 22 x 0.9 mm with knurled face, hot dip or electro-galvanized sheet steel. Bailey D-1001.

.4 Deflection Track: Bailey Multi-Slot Track MST 250, size to suit studs, and top deflection clips TDC 350 and TDC 587.

.5 Horizontal Flange attachment: Bailey Horizontal Flange Attachment Clip (HFA Clip)

.6 Hangers: minimum 4.1 mm diameter (or as required by ULC fire rating design requirements) mild steel rods.

2.2 Fasteners

.1 Powder activated fasteners: to suit structural conditions and fastening requirements and in accordance with manufacturer's recommendations: Ramset; Hilti; or approved equivalent.

.2 Sheet Metal Screws: To ASTM C1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

2.3 Accessories

.1 Acoustic sealant: As specified in Section 07 92 00.

.2 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self-sticking adhesive on one face, lengths as required.

.3 Zinc Rich Paint: to CGSB 1-GP-181M. Low VOC type.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in

accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Consultant.
.2 Inform Consultant of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Consultant.

3.2 Erection

.1 Comply with ASTM C754.

.2 All gypsum board shall be supported with steel framing whether indicated or not.

.3 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

.4 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum. Provide top deflection tracks where indicated or as required to permit structural deflection. Install top deflection clips as necessary to increase load capacity.

.5 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.6 Place studs vertically at 400 mm on centre unless noted otherwise and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.7 Erect metal studding to tolerance of 1:1000.

.8 Attach studs to bottom and ceiling track using screws.

.9 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.10 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.11 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.12 Install heavy thickness single jamb studs at openings.

.13 Erect track at head of door/window openings and sills of window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.14 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.15 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

.16 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.17 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.

.18 Install continuous insulating strips to isolate studs from un-insulated surfaces.

.19 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.3 Suspended and Furred Ceilings and Bulkheads

.1 Erect hanger and runner channels for suspended gypsum board ceilings and bulkheads in accordance with ASTM C754 and ASTM C841 except where specified otherwise and indicated on drawings.

.2 Securely anchor hanger to structural supports 1220 mm o.c. maximum along runner channels and not more than 150 mm from ends. Under no circumstances shall hanger wires be secured to or supported from mechanical or electrical materials or equipment or penetrate mechanical ductwork.

.3 Space runner or furring channels as shown on drawings and not more than 610 mm o.c. maximum nor 150 mm from walls. Run channels in long direction of board. Bend hanger sharply under bottom flange of runner and securely wire in place with a saddle tie. Provide channels below mechanical or electrical equipment and mechanical ductwork to maintain maximum spacing.

.4 Install furring channels transversely across runner channels in short direction of wallboard at 610 mm o.c. maximum or 150 mm from walls and interruptions in ceiling continuity. Secure channels to support with furring clips or wire. Where splicing is necessary lap minimum 200 mm and wire tie each end with double loops of 0.90 mm galvanized tie wire, 25 mm from each end of overlap.

.5 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture. Coordinate with Electrical.

.6 Install work level to tolerance of 1:1200.

.7 Frame with furring channels, perimeter of openings for access panels, light fixtures,

diffusers, grilles, etc.

.8 Install furring channels parallel to, and at exact locations of steel stud partition header track.

.9 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.

3.4 Gypsum Board

.1 Installation of gypsum board is specified in Section 09 21 16

3.5 Cleaning

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

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 09 21 16 Gypsum Board
.2 Section 09 53 00 Acoustical Suspension

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C423-23 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  .2 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
  .3 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products
  .4 ASTM E1414/E1414M-21a Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
  .5 ASTM E1477-98a(2022) Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
.2 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 Submittals

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

.2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
  .1 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

.3 Submit duplicate 300 x 300 mm samples of each type of acoustical units.

.4 Provide maintenance data for acoustic panel ceilings for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

.1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

.2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

.3 Mock-up:

.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
.2 Construct mock-up 10 m² minimum of acoustical panel tile ceiling including one inside corner and one outside corner.
.3 Construct mock-up where directed.
.4 Allow 48 hours for inspection of mock-up by Consultant before proceeding with ceiling work.
.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.6 Project Conditions

.1 Permit wet work to dry before beginning to install.

.2 Maintain uniform minimum temperature of 15° C and humidity of 20-40% before and during installation.

.3 Store materials in work area 48 hours prior to installation.

.4 Building areas to receive ceilings shall be free of construction dust and debris.

1.7 Performance Requirements

.1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
.1 Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 Classification.
.2 Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

.2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.8 Shipping, Handling and Storage

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

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

.3 Protect on site stored or installed absorptive material from moisture damage.

1.9 Waste Management and Disposal

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

1.10 Extra Materials

.1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.

.3 Ensure extra materials are from same production run as installed materials.

PART 2 PRODUCTS

2.1 Materials

.1 Acoustic units for suspended ceiling system: to ASTM E1264

.2 Panel Type 1:
- .1 Class A.
- .2 Composition: Water Felted Mineral Fiber
- .3 Pattern regular fissured.
- .4 Texture: medium.
- .5 Flame spread: ASTM E1264, Class A (U.L.C.), 25 or less.
- .6 Smoke developed 50 or less in accordance with ULC 102.
- .7 Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label, 0.55
- .8 Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label, 35
- .9 Light Reflectance (LR) range of 0.81 to ASTM E1477.
- .10 Dimensional Stability: Standard
- .11 Edge Profile: Square Lay-In
- .12 Colour: White.
- .13 Size 610 x 1219 x 16 mm thick.
- .14 Shape flat.
- .15 Surface coverings: Ecolabel certified paint.

.3 Panel Type 1:
- .1 Class A.
- .2 Ecolabel certified.
- .3 Composition: Wet Formed Mineral Fiber with Vinyl Latex Paint Finish
- .4 Pattern regular fissured.
- .5 Texture: medium.
- .6 Flame spread: ASTM E1264-98, Class A (U.L.C.), 25 or less.
- .7 Smoke developed 50 or less in accordance with ULC 102.
- .8 Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label, 0.70
- .9 Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label, 40
- .10 Light Reflectance (LR) range of 0.85 to ASTM E1477.
- .11 Dimensional Stability: Standard
- .12 Edge Profile: Square Lay-In
- .13 Colour: White.
- .14 Size 610 x 1219 x 19 mm thick.
- .15 Shape flat.
- .16 Surface coverings: Ecolabel certified paint.

.4 Ceiling Suspension System: as specified in Section 09 53 00.

PART 3 EXECUTION

3.1 Examination

.1 Do not install acoustical panels until work above ceiling has been inspected by Consultant.

3.2 Installation

.1 Co-ordinate with Section 09 53 00 - Acoustical Suspension.
.2 Coordinate layout and installation of ceilings with other construction that penetrates ceilings or is

supported by them, including light fixtures, HVAC equipment, and fire-suppression system.

.3 Install acoustical panels and tiles in ceiling suspension system.

.4 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width, with directional pattern running in same direction. Refer to reflected ceiling plan.

.5 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.3 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 12 23 Structural Steel
.2 Section 09 21 16 Gypsum Board
.3 Section 09 51 13 Acoustic Panel Ceilings
.4 Division 23 Mechanical
.5 Division 26 Electrical

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  .2 ASTM A641/A641M-19 Standard Specification for Zinc–Coated (Galvanized) Carbon Steel Wire.
  .3 ASTM A653 / A653M – 23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .4 ASTM A1011/A1011M-23 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
  .5 ASTM C635/C635M-22 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay in Panel Ceilings.
  .6 ASTM C636/C636M-19 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
  .7 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
  .8 ASTM E119-22 Standard Test Methods for Fire Tests of Building Construction and Materials
  .9 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products

1.4 Submittals

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

.2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

.3 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

.4 Submit one representative model of each type of ceiling suspension system.
  .1 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.5 Design Requirements

.1 Determine the superimposed loads that will be applied to suspension systems by components of

the building other than the ceiling and ensure that adequate hangers are installed to support the additional loads in conjunction with the normal loads of the system.

.2 Design supplemental suspension members and hangers where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers at required spacing to support standard suspension system members:
  .1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

.3 Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of L/360 to ASTM C635 deflection test.

1.6 Performance Requirements

.1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
  .1 Surface Burning Characteristics: Tested per ASTM E84 and complying with ASTM E1264 Classification.

.2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.7 Quality Assurance

.1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

.2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

.3 Where required, provide fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

.4 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and as described in Section 09 51 13.

1.8 Shipping, Handling and Storage

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

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

1.9 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Components: All main beams and cross tees, base metal and end detail shall be commercial quality hot-dipped galvanized steel as per ASTM C635. Main beams and cross tees shall be double-web steel construction with type exposed flange design. Exposed surfaces chemically

cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

.2 Face width: 22 mm

.3 Edge Moldings and Trim: Hemmed angle moulding to match main beams and cross tees.

.4 Structural Classification: Intermediate Duty System, ASTM C635.

.5 Colour: White and match the actual colour of the specified ceiling tile.

.6 Standard of Acceptance:
.1 Armstrong Prelude XL
.2 Donn DXT
.3 Certainteed Classic Environmental Stab.

.7 Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated or required.

.8 Threaded Rod: to ASTM A397. Galvanized or zinc plated.

.9 Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 2.06 mm thick.

.10 Channel Framing and Fittings: Strut type metal framing and components to ASTM A1011 or ASTM A653. Unistrut P1000SL or equivalent. Galvanized.

## PART 3 EXECUTION

### 3.1 Manufacturer’s Instructions

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

### 3.2 Examination

.1 Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

### 3.3 Preparation

.1 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

.2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
.1 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.4 Installation

.1 Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines and in accordance with the manufacturer's installation instructions.

.2 Install wall moldings at intersection of suspended ceiling and vertical surfaces.

.3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.

.4 Secure hangers to overhead structure using attachment methods as indicated by manufacturer. Do not suspend ceiling systems from building services including plumbing lines, conduit, cable trays or duct work.

.5 Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to: piping, ductwork, conduit and equipment. Provide trapeze or other supplementary support members at obstructions to allow typical hanger spacing. Brace assemblies must be configured and/or located in order to avoid obstructions in addition to maintaining the required brace assembly spacing.

.6 Install hangers spaced at maximum 1219 mm centres and within 152 mm from ends of main tees. Install hanger wires plumb and straight.

.7 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width.

.8 Ensure suspension system is coordinated with location of related components.

.9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, and speakers.

.10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture.

.11 Interlock cross member to main runner to provide rigid assembly.

.12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.13 Install access splines to provide ceiling access.

.14 Finished ceiling system to be square with adjoining walls and level within 1:1000

3.5 Cleaning

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

.2 Touch up scratches, abrasions, voids and other defects in painted surfaces.

End of Section

# PART 1 GENERAL

## 1.1 General

.1 Conform to the requirements of Division 1.

## 1.2 Related Sections

.1 Section 05 12 23 Structural Steel
.2 Section 05 21 00 Steel Joists
.3 Section 05 31 00 Steel Deck
.4 Section 05 50 00 Metal Fabrications
.5 Section 06 20 00 Finish Carpentry
.6 Section 07 19 00 Water Repellants
.7 Section 08 11 00 Metal Doors and Frames
.8 Section 08 14 16 Flush Wood Doors
.9 Section 09 21 16 Gypsum Board
.10 Section 09 64 66 Athletic Wood Flooring
.11 Section 09 72 00 Vinyl Wall Coverings
.12 Section 09 91 13 Exterior Painting
.13 Section 09 96 46 Intumescent Coatings

## 1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
.2 Environmental Protection Agency (EPA)
  .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
.3 Master Painters Institute (MPI)
  .1 MPI Architectural Painting Specifications Manual, 2018
  .2 MPI Standard GPS-1-12 and GPS-2-12 MPI Green Performance Standard for Painting and Coatings.
.4 Society for Protective Coatings (SSPC)
  .1 Systems and Specifications, SSPC Painting Manual 2009
.5 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102-18 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
.6 South Coast Air Quality Management District, California State (SCAQMD)
  .1 SCAQMD Rule 1113-96, Architectural Coatings.
.7 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997.
.8 National Fire Code of Canada

## 1.4 Submittals

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

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit full range colour sample chips.
.2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
.3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.

.5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
.1 Product name, number, type and use.
.2 Colour numbers.
.3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

.1 Qualifications:
.1 Contractor: to have a minimum of five years proven satisfactory experience.
.2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
.3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

.4 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

.5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.
.6 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
.1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen and textures. Locate where directed.

.2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
.3 Allow 24 hours for inspection of mock-up before proceeding with work.
.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

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

.2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 ° C to 30 ° C. Store materials and supplies away from heat generating devices.

.4 Observe manufacturer's recommendations for storage and handling.

.5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.

.6 Remove paint materials from storage only in quantities required for same day use.

.7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.8 Remove damaged, opened and rejected materials from site.

1.7 Fire Safety Requirements

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.8 Waste Management and Disposal

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

.2 Place materials defined as hazardous or toxic in designated containers. Handle and

dispose of hazardous materials in accordance with Municipal regulations.

.3 Unused materials must be disposed of at official hazardous material collections site.

.4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.

.5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.

1.9 Maintenance

.1 Extra Materials:
  .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
  .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

.1 Heating, Ventilation and Lighting:
  .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
  .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 ° C for 24 hours before, during and after paint application until paint has cured sufficiently.
  .3 Provide continuous ventilation for seven days after completion of application of paint.
  .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
  .5 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:
  .1 Unless pre-approved in writing by Consultant and product manufacturer, perform no painting when:
    .1 Ambient air and substrate temperatures are below 10 ° C.
    .2 Substrate temperature is above 32 ° C unless paint is specifically formulated for application at high temperatures.
    .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
    .4 The relative humidity is under 85% or when the dew point is more than 3 ° C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 ° C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.

.2 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
.3 Perform painting work when maximum moisture content of the substrate is below:
.1 Allow new concrete to cure minimum of 28 days.
.2 15% for wood.
.3 12% for plaster and gypsum board.
.4 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
.5 Test concrete and plaster surfaces for alkalinity as required.

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

## PART 2 PRODUCTS

### 2.1 Materials

.1 Provide paint materials for paint systems from single manufacturer.

.2 Products to meet requirements of GS-11 or SCAQMD Rule 1113-96

.3 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use.

.5 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.6 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
.1 Non-flammable, biodegradable.
.2 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
.3 Manufactured without compounds which contribute to smog in the lower atmosphere.
.4 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.
.5 Recycled content of 15% post-consumer and ½ post-industrial waste.

.7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.8 Flash point: 61 °C or greater for water-borne surface coatings and recycled water-borne surface coatings.

2.2 Colours

.1 Consultant will provide Colour Schedule.

.2 Colour schedule will be based upon selection of eight base colours and six deep tint accent colours.

.3 Selection of colours will be from manufacturer's full range of colours.

.4 Where specific products are available in restricted range of colours, selection will be based on limited range.

.5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

.1 Perform colour tinting operations prior to delivery of paint to site.

.2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

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

| Gloss Level Category/ | Units @ 60 Degrees | Units @ 85 Degrees |
|---|---|---|
| G1 – matte finish | 0 to 5 | Max. 10 |
| G2 – velvet finish | 0 to 10 | 10 to 35 |
| G3 – eggshell finish | 10 to 25 | 10 to 35 |
| G4 – satin finish | 20 to 35 | Min. 35 |
| G5 – semi-gloss finish | 35 to 70 | |
| G6 – gloss finish | 70 to 85 | |
| G7 – high gloss finish | > 85 | |

.2 Gloss level ratings of painted surfaces as specified and as noted on Finish Schedule.

2.5 Interior Painting Systems

.1 Concrete Horizontal Surfaces:
  .1 INT 3.2A Latex floor enamel [gloss] [low gloss] finish.
  .2 Concrete Floor Sealer: Refer to Section 09 67 00-Fluid Applied Flooring.

.2 Concrete Vertical Surfaces:
  .1 Water repellant sealer as specified in Section 07 19 00 –Water Repellants.

.3 Structural Steel:
  .1 INT 5.1X Latex G5 semi-gloss finish (over quick dry shop primer).

.4 Metal Fabrications:
  .1 INT 5.3A Latex G5 semi-gloss finish

.5 Metal Floors and Decking:
  .1 INT 5.1LL Epoxy Deck Coating finish (over epoxy primer).

.6 Zinc Coated Metal Deck:
  .1 INT 5.3H. Interior Latex semi-gloss, dry fog/fall type.

.7 Galvanized Metal: interior doors, frames, railings, misc. steel, pipes, and ducts.
  .1 INT 5.3A Latex G5 semi-gloss finish

.8 Concrete Masonry:
  .1 INT 4.2D High performance architectural latex G5 semi-gloss finish.

.9 Concrete masonry units at wet areas and change rooms:
  .1 INT 4.2G Epoxy (tile-like) finish.

.10 Wood Clear Polyurethane Finish:
  .1 INT 6.3K Polyurethane varnish G6 gloss finish.

.11 Interior Wood Doors
  .1 INT 6.3A High performance architectural latex G5 semi-gloss finish.

.12 Wood Fire Retardant Finish (ceilings and soffits)
  .1 INT 6.3S water-borne fire retardant, clear finish, ULC approved. Flame spread rating 150.

.13 Electrical Equipment Backboards:
  .1 INT 6.4P Fire retardant, pigmented coating. Low odour/low VOC. Semi-gloss (UL/ULC rated).

.14 Gypsum Board: Walls and Bulkheads.
  .1 INT 9.2A Latex G3 eggshell finish over latex sealer.

.15 Gypsum Board: Ceilings and Bulkheads:

.1 INT 9.2A Latex G2 velvet finish over latex sealer.

.16 All other surfaces not noted above: high performance finish suitable for commercial and institutional environment and in accordance with MPI painting manual.

## PART 3 EXECUTION

### 3.1 General

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and application instructions, and data sheets.

### 3.2 Examination

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report damages, defects, unsatisfactory or unfavourable conditions to Consultant before proceeding with work.

### 3.3 Preparation

.1 Protection:
- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking and in accordance with paint manufacturers and MPI recommendations. If damaged, clean and restore surfaces as directed by Consultant.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.

.2 Surface Preparation:
- .1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .2 Place "WET PAINT" signs in occupied areas as painting operations progress.

.3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
- .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths, or compressed air.
- .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
- .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
- .4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
.6 Use trigger operated spray nozzles for water hoses.
.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
.2 Apply wood filler to nail holes and cracks.
.3 Tint filler to match stains for stained woodwork.

.6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.

.7 Touch up of shop primers with primer as specified.

.8 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.4 Application

.1 Apply paint materials in accordance with paint manufacturer's written application instructions.

.2 Brush and Roller Application:
.1 Apply paint in uniform layer using brush and/or roller type suitable for application.
.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray application:
.1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as

necessary.

.3 Apply paint in uniform layer, overlapping at edges of spray pattern. Back roll first coat application.

.4 Brush out immediately all runs and sags.

.5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 Finish surfaces both above and below sight lines as specified for surrounding surfaces.

.8 Finish alcoves as specified for adjoining rooms.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 Mechanical/Electrical Equipment

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces.

.2 Mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint natural gas piping yellow.

.10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint

conduits, mounting accessories and other unfinished items.

.11 Do not paint interior transformers and substation equipment.

3.6 Field Quality Control

.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

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

3.7 Cleaning and Restoration

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

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

End of Section