

N45 project no. 25-894
CAMBRIDGE PUBLIC
SCHOOL ADDITION

2123 RTE 500W, EMBRUN, ONTARIO

SPECIFICATIONS
ISSUED FOR TENDER
FEBRUARY 10, 2026

Volume 1 of 1
Architectural Specifications
division 0 - division 32 incl.

CAMBRIDGE PUBLIC
SCHOOL ADDITION
2123 RTE 500W, EMBRUN, ONTARIO

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Specifications and Drawings

for

Cambridge Public School

2123 Route 500 W
Embrun, ON K0A 1W0
prepared for

Upper Canada District School Board

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prepared by

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Reports and Studies:

Geotechnical Investigation Report, Cambridge Public School Addition and Civil Work, 2123 Route 500 W, Embrun, Ontario dated Dec 9, 2025 by exp

Hazardous Building Materials Assessment, Cambridge Public School, 2123 Route 500 West, Embrun, Ontario. Pinchin File 302783.062 - Dated March 28, 2023.

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E005	Riser Diagram – Phase 1 Existing Work	IFT	10 FEB 26
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E201.1	Ground Floor – West Side of Addition – Power & Systems Work	IFT	10 FEB 26
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E301.1	Rooftop – Existing Building – Power & Systems – Demolition Work	IFT	10 FEB 26
E301.2	Rooftop – Existing Building – Power & Systems – New Work	IFT	10 FEB 26
E301.3	Rooftop – Existing Building – Power & Systems – Demolition Work	IFT	10 FEB 26
E301.4	Rooftop – Existing Building – Power & Systems – New Work	IFT	10 FEB 26
E301.5	Rooftop – New Addition – East Wing – Power & Systems – New Work	IFT	10 FEB 26
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E401.1	Panel Schedule	IFT	10 FEB 26

END OF SECTION

PART 1- GENERAL

1.1 REQUIREMENTS INCLUDED

- .1 Requirements and limitations for cutting and patching the Work and making good.

1.2 RELATED WORK

- .1 General Instructions Section 00 21 14
- .2 Common Product Requirements Section 01 61 00
- .3 Individual Sections: cutting and patching incidental to work of the particular section. Advance notification to other sections required.
- .4 Drawings and notes on drawings, including printed notes specifically referring to "cutting, patching and making good".

1.3 SUBMITTALS

- .1 Submit written request 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.
- .2 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Written permission of affected separate contractor.
 - .7 Date and time work will be executed.

1.4 GENERAL

- .1 Execute cutting, fitting, and patching, including excavation and fill, to complete the work.
- .2 Fit the 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 Remove samples of installed work for testing.
- .6 Provide openings in non-structural elements of work for penetrations of mechanical and electrical work.

1.5 INSPECTION

- .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.

1.6 PREPARATION

- .1 Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of project from damage.
- .2 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.7 PERFORMANCE

- .1 Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- .2 Use material to match existing.
- .3 For a change in material submit request for substitution under provisions of Section 01600.
- .4 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .5 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed without prior approval.
- .6 Restore work with new products in accordance with requirements of Contract Documents.
- .7 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .8 At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with the specified fire-rated material, full thickness of the construction element.
- .9 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

END OF SECTION

1 PERMITS, FEES, AND CERTIFICATES

- .1 The Building Permit will be paid for by the Owner.
- .2 Provide the Authorities with such plans and information as may be required for the issuance of Acceptance Certificates.
- .3 Obtain all Inspection Certificates required by Authorities having jurisdiction. Hand over copies of Certificates to the Architect.

2 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract drawings, with items of Addenda updates at each location on drawings.
 - .2 Regulatory Authority approved and Drawings, Permits, Certificates, etc.
 - .3 Contract Specification.
 - .4 Reviewed shop drawings.
 - .5 Change Orders and Site Instructions.
 - .6 Other modifications to Contract.
 - .7 Field test reports.
 - .8 Copy of approved work schedule.
 - .9 Manufacturers' installation and application instructions.
 - .10 Record set of As-built Drawings.
 - .11 Minutes of Project Meeting.

3 WORK SCHEDULE

- .1 Provided within ten (10) working days after Contract award, construction network diagram showing anticipated progress stages and final completion of work within time period required by Contract Documents. Reference Construction Progress Schedule Section 01 32 16.
- .2 The Contractor shall include for all regular, double shift and weekend work required to meet completion dates, as advised during the pre-bid project briefing and as scheduled in the Instructions to Bidders.

4 COST BREAKDOWN AND CASH FLOW PLAN

- .1 Before submitting first Progress Claim, submit a breakdown of Contract price in detail as directed by the Architect. After approval by the Architect cost breakdown will be used as basis for progress payment.
- .2 The Cash Flow Plan, if requested, will indicate anticipated progress payments. It will be formatted similar to that used by the Contractor for progress payments. The Cash Flow Plan will be updated and submitted to the Architect concurrent with each request for progress payments.

5 CONTRACTOR'S USE OF SITE

- .1 Refer to Section 01 52 00 for Construction Facilities, Section 01 51 00 Temporary Utilities, and Section 01 56 00 Temporary Barriers and Enclosures.
- .2 Do not unreasonably encumber site with materials or equipment.
- .3 Obtain and pay for use of additional storage or work areas needed for operations.

6 CODES AND STANDARDS

- .1 Perform work in accordance with Ontario Building Code, and any other code of National, Provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

7 PROJECT MEETINGS

- .1 Hold project meetings at times and locations approved and chaired by Architect. Prepare minutes of all meetings.
- .2 Notify all parties concerned of meetings.
- .3 The recorded minutes will form part of the project record and shall be distributed to all parties within seven (7) days of meeting.

8 TELECOMMUNICATIONS

- .1 It is the Contractor's responsibility to co-ordinate and pay for his own telecommunication services.

9 GENERAL COMPLIANCE

- .1 Comply with all Canadian Construction Document CCDC 2 (2020) General and Supplementary Conditions.
- .2 It is the Contractor's responsibility to co-ordinate interdependent trades' activities between Divisions, with special attention to Mechanical and Electrical Divisions.

10 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform the Architect of impending installation and obtain his approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by the Architect.
- .5 The Contractor will take all necessary steps to have equipment that was removed or replaced as part of any Work disposed of or decommissioned in accordance with appropriate disposal or decommissioning processes, applicable laws, and in accordance with commercially reasonable environmental practices.
- .6 The contractor will provide before and after pictures of equipment nameplates.
- .7 The Contractor must submit written proof or evidence or acknowledgement that the disposal of all materials was done in accordance with all current disposal requirements.
 - .1 Acceptable Documents are invoices OR disposal certificates from the disposal facility. This documentation must be on the disposal facility's letterhead, invoice,

or certificate. Minimum Information Required:

- .1 building name and address
- .2 equipment description (lamps, motors, cooling equipment, etc.)
- .3 equipment quantities
- .4 disposal facility name

11 LINES AND LAYOUT

- .1 The Contractor shall employ a qualified Ontario Land Surveyor who will establish and lay out in the field all main lines and levels of the project and assume for the Contractor the responsibility for their accuracy and well-being and by such procedure will absolve the Architect and Owner from any costs whatsoever to rectify from any cause.
- .2 The surveyor shall verify the known Geodetic elevation and transfer that elevation to a sufficient number of benchmarks or permanent monuments on the site to minimize any inaccuracy of long range shooting. He will correlate such Geodetic elevation with the elevations in use by all public utilities within the area and particularly adjacent to the project.
- .3 The Contractor shall also employ and pay the Ontario land Surveyor to provide a post-construction survey upon completion of foundations and site work showing "As-built" dimensions, location, angles and geodetic elevations of the work.

12 CONCEALMENT

- .1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas unless specifically noted to be exposed.
- .2 If any doubt arises as to means of concealment, or intent of Contract Documents in this connection, request clarification from Consultant before proceeding with portion of work in question.

13 CUTTING, FITTING AND PATCHING

- .1 Refer also to Section, Cutting, Patching and Making Good.
- .2 Execute cutting (including excavation), and fitting and patching required to make work fit properly.
- .3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.
- .4 Obtain Architect's approval before cutting, boring or sleeving load-bearing members.
- .5 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .6 Fit work airtight to pipes, sleeves, ducts and conduits.
- .7 Carefully read all notes on drawings and comply as required.
- .8 At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, the specified full thickness of construction element.
- .9 Cut rigid materials using power saw or core drill. Pneumatic or impact tools not allowed.

14 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities and the Owner, with minimum of disturbance to pedestrians, vehicular traffic and the operation of the existing building.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify the Architect of findings.
- .3 Submit schedule to and obtain approval from governing authorities and the Owner for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties. Provide a minimum five (5) working days notice of pre-scheduled interface activities affecting utility services or adjacent use of properties.
- .4 Where unknown services are encountered, immediately advise the Architect and confirm findings in writing.
- .5 Record locations of maintained, re-routed and abandoned service lines.

15 EXAMINATION OF DRAWINGS, SPECIFICATIONS AND SITE

- .1 Where a discrepancy between various consultants' drawings exists, the most stringent requirement shall prevail.
- .2 Defects in work prepared by the Contractor or Sub-contractor affecting the work of another contractor shall be reported to the Architect. Failure to report or commencement of further work over the defect shall mean acceptance of the condition. The Contractor shall hold the Owner harmless from costs arising from these defects and their remedies.

16 DIVISION OF WORK

- .1 Work specified in the Specification has been divided into Sections for convenience only. Division of work among Sub-contractors and suppliers is solely the Contractor's responsibility and Consultant assumes no responsibility to act as an arbiter to establish subcontract limits between Sections or Divisions of work.
- .2 Tender Documents are issued as a whole, and no distinction shall be made between architectural, mechanical, electrical, etc portions of the work. Information shown in any part of the tender documents shall be binding and General Contractor is required to coordinate work among various sub-trades.
- .3 The Contractor shall examine all drawings, all sections of the specifications, the site, and existing building for information affecting the work, and project schedule.

17 COOPERATION

- .1 The Contractor and his Sub-contractors shall be familiar with each other's work wherein it affects their own work.
- .2 The Contractor shall be responsible for the scheduling of materials and the exchange of information between himself and his Sub-contractors for the execution and completion of the work, i.e., shop drawings, progress schedules, articles to be built-in, location of openings.
- .3 By custom or precedent, the Contractor and the Sub-contractors shall make allowances in their work to accommodate each other's work, i.e., cutting, patching, and building in.

- .4 The Contractor shall hold the Owner harmless from costs or damages resulting from failure to cooperate as outlined herein.

18 EMERGENCY CALL-OUT PROCEDURES

- .1 The Contractor will provide the Architect and Owner with up-to-date emergency call-out procedures and numbers.

19 SAFETY REGULATIONS

- .1 The Contractor will comply with all municipal, provincial and federal regulations. Also refer to Section 01 35 29 Health and Safety Requirements.

20 PARKING

- .1 For the duration of the project, provide adequate parking for trade contractors. Provide designated parking spaces for the Owner (1), Architect (1) and Consultants (3).

21 MAINTAIN, CO-ORDINATE WITH WASTE AUDIT SECTION

- .1 Except as directed by the Owner or noted on documents, all waste and redundant materials become the property of the Contractor and will be removed at the Contractor's expense from the Owner's property.
- .2 Removed materials will be disposed of in accordance with the latest applicable municipal, provincial, or Federal Government regulations.
- .3 For hazardous waste, the Contractor will provide the Consultant with copies of all completed transportation manifests.

22 ADDITIONAL DRAWINGS

- .1 The Architect may furnish additional drawings to assist proper execution of work. These drawings will be issued for clarification only. Such drawings shall have same meaning and intent as if they were included with plans referred to in Contract Documents.

23 WORKMANSHIP

- .1 Workmanship shall be best quality, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Architect if required work is such as to make it impractical to produce required results.
- .2 Do not employ an unfit person or anyone unskilled in their required duties.
- .3 Decisions as to quality or fitness of workmanship in cases of dispute rest solely with Architect, whose decision is final.

24 PROTECTION OF BUILDING FINISHES AND EQUIPMENT

- .1 New Construction:
 - .1 Provide protection for finished and partially finished building finishes and equipment during performance of work.
 - .2 Provide necessary screens, covers, hoardings as required.
 - .3 Be responsible for damage incurred due to lack of or improper protection.

- .2 Existing Landscaping and Property:
 - .1 Ensure that no damage is caused to existing pavements, fences, curbs, grounds, plants, property, utilities, services, and finishes designated to remain during the progress of the work. Repair and make good any damage caused at no extra cost to the Owner. Do not proceed with remedial work without written permission of the Architect.
 - .2 Keep municipal access roads clean of mud and debris resulting from construction traffic.
 - .3 Prevent soiling of pavement due to spillage, mixing of material or any cause. Make good any damage caused.
 - .4 Protect work during periods of suspension, regardless of reason for suspension.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

.1	Section 01 32 16	Construction Progress Schedule
.2	Section 01 35 00	Traffic Control
.3	Section 01 35 29	Health and Safety Requirements
.4	Section 01 35 43	Environmental Procedures
.5	Section 01 41 00	Regulatory Requirements
.6	Section 01 45 00	Quality Control
.7	Section 01 51 00	Temporary Utilities
.8	Section 01 52 00	Construction Facilities
.9	Section 01 56 00	Temporary Barriers and Enclosures

1.2 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.4 SCHEDULING AND CONTRACTORS USE OF SITE

- .1 Use of site for execution of the work and as otherwise noted or indicated.
- .2 Dates and Hours of work.
 - .1 The school is available from 7:00 am to 10:30 pm each day. During school hours (9:25 am to 3: 50 pm) commencing April 2026, work can be performed in the following locations as scheduled with Project Manager.
- .3 Dates and Hours of various portions of the work.
 - .1 Coordinate with UCDSB Project Manager for final schedule
 - .2 The existing daycare is operational throughout the calendar year.
 - .3 Work in the existing school and roof over the existing building to be completed over the summer months (June to August)
 - .4 Contractor Mobilization can start on April 1, 2026 and all work is to be substantially completed on July 3, 2028
 - .5 Close-out reporting is due September 1, 2029
 - .6 Balance of site works start date is to be determined by General Contractor and is to be substantially complete by October 4, 2028
 - .7 Occupancy and handover of the site to the owner is to be completed by September 1, 2028
 - .8 All playgrounds and sports field to be fully accessible and available for student use during school calendar.
 - .9 Installation of security cameras and wiring can be performed on school days after 3:50 PM.
 - .10 The school is available for scheduled weekend work.
 - .11 Custodian work hours are from 7 am to 3 pm. Contractor may be responsible to disarm and arm the security system each day.
 - .12 Arrange with UCDSB Project Manager for security codes and access.
- .4 Confine operation, storage access and parking to owner's discretion.
- .5 Do not unreasonably encumber site with materials or equipment.

- .6 Move stored products or equipment which interferes with operations of owner or other contractors.
- .7 Obtain and pay for additional storage or work areas needed for operations.
- .8 Maintain project grounds and public areas free of rubbish and waste materials.

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the Owner and Consultants to facilitate work as stated.
- .2 Hours of work: Custodian summer work hours are 7:00 AM to 3:00 PM. After hours and week-end access can be arranged with School Board. Owner to provide contractor with keys and security code if required.
- .3 Maintain existing services to building and provide for personnel and vehicle access.
- .4 Where security is reduced by work provide temporary means to maintain security.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants and normal use of premises. Arrange with Owner and Consultant to facilitate execution of work.

1.5 EXISTING SERVICES

- .1 Notify Owner, Consultant and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Owner a minimum of 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for personnel, pedestrian and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16 Construction Progress Schedule.

1.7 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

1.8 BUILDING SMOKING ENVIRONMENT

- .1 Smoking is not permitted, as per the Smoke-Free Ontario Act.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Owner/Contractor Agreement.
- .2 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2020, Stipulated Price Contract.

1.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Refer to CCDC2-2020
- .2 Make applications for payment on account as monthly as Work progresses.
- .3 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work at that date.
- .4 Submit to Consultant, at least 14 days before first application for payment. Schedule of values for parts of Work, aggregating total amount of Contract Price, to facilitate evaluation of applications for payment.

1.3 SCHEDULE OF VALUES

- .1 Refer to CCDC 2-2020.
- .2 Provide schedule of values supported by evidence as Consultant may reasonably direct and when accepted by Consultant, be used as basis for applications for payment.
- .3 Include statement based on schedule of values with each application for payment.
- .4 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Consultant may reasonably require to establish value and delivery of products.

1.4 PREPARING SCHEDULE OF UNIT PRICE TABLE ITEMS

- .1 Submit separate schedule of unit price items of Work requested in Bid form.
- .2 Make form of submittal parallel to Schedule of Values, with each line item identified same as line item in Schedule of Values. Include in unit prices only:
 - .1 Cost of material.
 - .2 Delivery and unloading at site.
 - .3 Sales taxes.
 - .4 Installation, overhead and profit.
- .3 Ensure unit prices multiplied by quantities given equal material cost of that item in Schedule of Values.

1.5 PROGRESS PAYMENT

- .1 Refer to CCDC 2-2020.
- .2 Consultant will issue to Owner, no later than 10 working days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Consultant determines to be due. If Consultant amends application, Consultant will give notification in writing giving reasons for amendment.

1.6 SUBSTANTIAL PERFORMANCE OF WORK

- .1 Refer to CCDC 2-2020.
- .2 Prepare and submit to Consultant comprehensive list of items to be completed or corrected and apply for a review by Consultant to establish Substantial Performance of Work or substantial performance of designated portion of Work when Work is substantially performed if permitted by lien legislation applicable to Place of Work designated portion which Owner agrees to accept separately is substantially performed. Failure to include items on list does not alter responsibility to complete Contract.
- .3 Prepare application in accordance with OAA/OGCA Document 100.
- .4 No later than 10 working days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than 10 working days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.
- .5 Consultant shall state date of Substantial Performance of Work or designated portion of Work in certificate.
- .6 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.
- .7 Publish Substantial Performance in Daily Commercial News and provide publication certificate to the Owner and Consultant.

1.7 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

- .1 Refer to CCDC 2-2020.
- .2 Refer to OAA/OGCA Document 100.
- .3 After issuance of certificate of Substantial Performance of Work:
 - .1 Submit application for payment of holdback amount.
 - .2 Submit sworn statement that accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Owner might in be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.
- .4 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of holdback amount.

1.8 FINAL PAYMENT

- .1 Refer to CCDC 2-2020.
- .2 Submit application for final payment when Work is completed.
- .3 Consultant will, no later than 10 working days after receipt of application for final payment, review Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than 10 working days after reviewing Work.
- .4 Consultant will issue final certificate for payment when application for final payment is found valid.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Ministry of Transportation, Ontario (MTO), Ontario Traffic Manual, Book 7: Temporary Conditions-01
- .2 U.S. Department of Transportation, Manual of Uniform Traffic Control Devices for Streets and Highways (UTCD) - 2009
- .3 Applicable Municipal By-Laws

1.2 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .3 Close lanes of road only after receipt of written approval from Consultant.
 - .1 Before re-routing traffic erect suitable signs and devices to Ontario Traffic Manual, Book 7: Temporary Conditions.
- .4 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
 - .1 Provide 7 m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.
 - .2 Provide 5 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.
- .5 Provide gravelled detours or temporary roads to facilitate passage of traffic around restricted construction area: Grade for detour in accordance with Provincial and Municipal Regulations.

1.3 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, [flashing warning lights] and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to Manual of Uniform Traffic Control Devices for Streets and Highways and Ontario Traffic Manual, Book 7: Temporary Conditions.
- .3 Place signs and other devices in locations recommended in Manual of Uniform Traffic Control Devices for Streets and Highways and Ontario Traffic Manual, Book 7: Temporary Conditions.
- .4 Meet with Consultant prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Consultant.

- .5 Continually maintain traffic control devices in use:
- .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
- .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.4 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to Manual of Uniform Traffic Control Devices for Streets and Highways and Ontario Traffic Manual, Book 7: Temporary Conditions for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .7 At each end of restricted sections where pilot cars are required.
 - .8 Delays to public traffic due to contractor's operators: 15 minutes maximum.
- .2 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system.
 - .1 Adjust, as necessary, and regularly maintain system during period of restriction.
 - .2 Ensure signal system meets requirements of Manual of Uniform Traffic Control Devices for Streets and Highways and Ontario Traffic Manual, Book 7: Temporary Conditions.

END OF SECTION

PART 1 – GENERAL

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Consultant.
- .2 Distribute written notice of each meeting four days in advance of meeting date Consultant.
- .3 Provide physical space and make arrangements for meetings.
- .4 Preside at meetings.
- .5 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .6 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .7 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within seven (7) days after issuance of Purchase Order by the Owner, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Owner, Consultants, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16 - Construction Progress Schedule.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .7 Owner provided products.
 - .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
 - .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
 - .11 Monthly progress claims, administrative procedures, photographs, hold backs.
 - .12 Appointment of inspection and testing agencies or firms.

- .13 Insurances, transcript of policies.
- .6 During construction coordinate use of site and facilities through Consultant's procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
- .7 Comply with instructions of Owner for use of temporary utilities and construction facilities.

1.3 PROGRESS MEETINGS

- .1 During course of Work, schedule progress meetings as required for the duration of the project.
- .2 Contractor, major Subcontractors involved in Work, Owner and Consultants are to be in attendance.
- .3 Notify parties minimum 5 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
- .1 CCDC 2-2020

- .2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be graveled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding (including overhead protection) in accordance with CAN/CSA-S269.2., local and provincial authorities having jurisdiction.

1.5 SITE ENCLOSURE

- .1 Protect public and workers from injury.
- .2 Provide and maintain required barricades, guardrails, and guardlights in accord with applicable regulations.
- .3 For the duration of project, provide heavy-duty steel construction fence as indicated on the site plan. Provide lockable gate for access to work area and material deliveries. Lock for gated

access area to be provided by Owner.

1.6 ENCLOSURE OF STRUCTURE

- .1 Provide temporary weathertight enclosures and protection for exterior openings until permanently enclosed.
- .2 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .3 Design enclosures to withstand wind pressure and snow loading.

1.7 TEMPORARY STAIRS

1. Furnish and maintain all equipment such as stairs, ladders, ramps, scaffolds, swing stages, runways, derricks, chutes, elevators, etc. as required for proper execution of work.
2. Construct and maintain scaffolding in rigid, secure and safe manner. Erect scaffolding independent of walls. Remove promptly when no longer required.
3. Provide all necessary temporary barricades, fencing, guardrails, night lights, overhead protection and barriers as necessary for the work.
4. Where such structures are of a complicated nature, employ the services of a Registered Professional Engineer to design such scaffolding, framework, or other temporary supports.

1.8 HOISTING

- .1 Provide, operate and maintain hoists and/or cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists / cranes to be operated by qualified operator.

1.9 SITE STORAGE/LOADING

- .1 Refer to CCDC 2
- .2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .3 Provide in an area designated by the Owner adequate weathertight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.
- .4 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.10 CONSTRUCTION PARKING

- .1 Parking may be permitted on site with Owner's permission.
- .2 Provide and maintain adequate access to project site.
- .3 Clean runways and taxi areas where used by Contractor's equipment.

1.11 SECURITY

- .1 If required, provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.12 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.13 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.14 SANITARY FACILITIES

- .1 Owner will designate sanitary facilities for work force.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times.
- .9 Remove, upon completion of work.

1.16 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Certificates and transcripts.

1.2 ADMINISTRATIVE

- .1 Submit electronically, to Consultant within 14 days from award, submittals listed for review. 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 with until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .10 Keep one reviewed copy of each submission on site.

1.3 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 by Contractor to illustrate details of a portion of Work.
- .2 Provide Professional Engineer's stamp and signature, on the front face of the submission where specific sections of the specification so direct. Note that formal drawings will not be reviewed unless the noted Professional Engineer's stamp and signature is present. Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.
- .3 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.
- .4 Photocopies, Scans, PDF's of the original Tender Documents, will not be accepted for Shop Drawings.
 - .5 Allow 15 working 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 Shop drawings to be originals prepared by the Contractor, Subcontractor, Supplier or Distributor, which illustrate the appropriate portion of the Work; showing fabrication, layout, setting or erection details, as specified in the appropriate Sections.
 - .11 Drawings and product data may be submitted in PDF format and sent to the Consultants via email with appropriate transmittals. Project Administrator is to include the Project Manager with copies of all Shop Drawing submissions. If PDF submissions are distributed via email, copy in (c.c.), the appropriate Consultants.
 - .12 Electronic PDF shop drawings must be properly titled by the General Contractor or will be returned. Filing must start with the shop drawing number and must include the title of the

Submission; Example: 05 55 00 - 01 Steel Stairs

- .13 Identify content of shop drawings by reference to specification Section numbers.
- .14 Identify details by reference to sheet and detail numbers shown on the Contract Drawings.
- .15 If hard copies are used, submit 3 reproducible drawing and/or data packages.
- .16 After Consultant's review, distribute copies.
- .17 Schedule shop drawing submissions at least twenty (20) days before the dates reviewed submissions will be needed.
- .18 Submit electronic copies 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.
- .19 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within [3] years of date of contract award for project.
- .20 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .21 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .22 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.
- .23 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .24 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant.
- .25 Delete information not applicable to project.
- .26 Supplement standard information to provide details applicable to project.
- .27 If upon review 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.
- .28 The review of shop drawings by Consultant is for sole purpose of ascertaining conformance with

general concept.

- .1 This review shall not mean that 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.

1.4 SAMPLES

- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Consultant's business address.
- .3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 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.
- .6 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

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

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- 1 The Occupational Health and Safety Act- Revised Statutes of Ontario, Revised Regulation 851/90, amended to O. Reg 98/11.
- .2 Hazardous Projects Act and the Canada Labour Code, most recent edition.
- .3 Occupational Health and Safety Regulation for Construction Projects. Revised Statutes of Ontario, Regulation 213-91 as amended by O.Reg. 443/09.
- .4 The Workplace Safety and Insurance Act. 1997 as amended by 1997, c. 26, Sched.:1998, c. 36,: 1999, c.6, s. 67; 2000, c 26, Sched. 1; 2001, c. 9 Sched.1, s. 4; 2002, c. 8, Sched. P.s 8; 2002, c. 18, Sched. J, s. 5; 2004, c. 8, ss. 46, 47, (2); 2004, c. 17, s. 32; 2005, c. 5, s. 73; 2005, c. 29 s. 7; 2006, c. 13, s. 4; 2006, c.19, Sched. M, s. 7.
- .5 Ontario Building Code Act S.O. 1992, c. 23, and Ontario Regulation 403/97 as amended to O. Reg. 422/06.
- .6 The Ontario Fire Code, O. Reg. 388/97 as amended by 315/01.
- .7 Regulation 447 - Environmental Protection Act as amended to O. Reg. 237/07.
- .8 Workplace Safety and Insurance Board, Regulation 1101, First Aid requirements.
- .9 National Building Code 2010, Part 8; Safety Measures at construction and Demolition Sites.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site-specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Post in the Site Trailer site health and safety inspection reports of Contractor's authorized representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets
- .7 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations. Post on Site.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work and provide electronic copy to Owner.

1.4 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.5 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.6 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

1.7 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Health and Safety Act, R.S.O.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise the Owner verbally and in writing.

1.10 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-Ordinator. Health and Safety Co-Ordinator must:
 - .1 Have site-related working experience specific to activities associated with the Project.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.11 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction.
- .2 Post 'Construction Zone' signs in all locations where work is being performed.

1.12 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction.

1.13 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.14 FALL PROTECTION

- .1 Comply with Occupational Health and Safety Act and Regulations for Construction projects, Section 26, as described herein but limited too:
 - .1 Fall protection will be required when a worker is exposed to a fall of more than 3 meters.
 - .2 Fall protection shall be in the form of:
 - .1 Guardrail system
 - .2 Travel restraint system
 - .3 Fall restricting system
 - .4 Fall arrest system
 - .3 The components of any system listed above shall be designed by a professional engineer in accordance with good engineering practice, and shall meet the requirements of any of the National Standards of Canada that are applicable.
- .2 A wood guardrail system shall consist of a top rail, intermediate rail, and a toe board. The top rail shall be located at least 0.9m but no more than 1.1m above the surface on which the system is installed. The toe board shall extend at least 89mm above the surface on which the system is installed. The maximum distance between two adjacent posts of the guardrail system shall be 2.4m. Wood shall be SPF construction grade quality or better. Members shall be at least 38mm by 89mm. Members to resist prescribed point loads.
- .3 A travel restraint system shall consist of a full body harness (with adequate attachment points) or a safety belt. The full body harness or safety belt shall be attached by a lifeline or lanyard to a fixed supportable able to resist the prescribed static and dynamic forces.
- .4 A fall restrict system shall consist of assembly of components attached to a fixed support able to resist the prescribed static and dynamic forces. Worker's free fall distance must not exceed 0.6m.
- .5 A fall arrest system shall consist of a full body harness with adequate attachment points and a lanyard equipped with a shock absorber. The fall arrest system shall be attached by a lifeline or lanyard to a fixed support able to resist the prescribed static and dynamic forces. The fall arrest system shall be arranged so that a worker cannot hit the ground or an object or level below the work. The worker who falls not be subjected to a fall arrest force greater than 8 kilonewtons.

1.15 SAFETY AND SECURITY REQUIREMENTS

- .1 Enforce use of CSA approved hardhats and safety boots for all entering or working on construction site.
- .2 The contractor shall remove from the site any persons not observing or complying with safety requirements.
- .3 The Contractor will report to the Owner's representative, and jurisdictional authorities, any accident or incident involving the Contractor, the Owner's staff, or the public; personnel and/or property, arising from the Contractor's execution of the work.
- .4 The Contractor will include all provisions of the Contract in so far as they are pertinent in any

- agreement with Sub-contractors, and hold all Sub-contractors equally responsible for safe work performance.
- .5 Delays in the progress of the Work arising out of infractions of legislation or Contract health and safety requirements are the responsibility of the Contractor.
 - .6 Provide and maintain adequate lighting where workmen or public may be subject to hazards and in all working areas.
 - .7 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and the provision of material safety data sheets.
 - .8 In addition to the requirements of the Occupational Health and Safety Act, and Regulations for Construction Projects, provide temporary safeguards and protection against:
 - .1 Accident or injury to any workmen or other persons on the site, adjacent work and property, roads and walks.
 - .2 Damage to any part of the work and to any adjoining or adjacent structure, properties, pavements, walks, services, and other similar items by frost, weather, overloading, and any other cause resulting from the execution of the work.
 - .9 Make good with material identical with existing and adjoining surfaces any damage resulting from the execution of the work to any part of the work or any buildings, pavements, landscaping, poles, hydrants, services, etc., on or surrounding the site.
 - .10 Fire extinguisher must be on hand at all times when propane torch or other flame/heat producing device is being used.
 - .11 The Contractor shall be responsible to insure that all individuals accessing the roof is properly trained in "Working at Heights" as required by the Ministry of Labour of Ontario. Anyone not in possession of a certification card should not be allowed on the roof.
 - .12 Post Construction area Signs, Authorized personal only. Hard hats and Safety shoes to be worn beyond this point.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .2 Reference Standards:
 - .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2020 Stipulated Price Contract.
 - .2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
 - .2 EPA General Construction Permit (GCP) 2012.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Before commencing construction activities or delivery of materials to site, prepare Environmental Protection Plan.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

1.3 FIRES

- .1 Fires and burning of rubbish on site is not permitted.
- .2 Provide supervision, attendance and fire protection measures as require.

1.4 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated Consultant.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with Ontario Building Code including amendments up to tender closing date 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.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Owner.
- .1 Prior to starting demolition work, refer to 'Hazardous building materials assessment report' for location and proper removal procedure of Hazardous materials. Pre and post air monitoring to be provided for removals. Results to be turned over to owner upon completion.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Owner.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Owner.

1.3 BUILDING SMOKING ENVIRONMENT

- .1 No smoking is allowed within the limits of Owner's property, as per the Smoke-Free Ontario Act.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
- .1 CCDC 2-2020, Stipulated Price Contract.

1.2 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Equipment and system adjust and balance.

1.3 INSPECTION

- .1 Allow 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.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant, instructions, or law of Place of Work.
- .3 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.
- .4 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, the Owner shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Owner for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Owner.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for re-testing and re-inspection.

1.5 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.

1.6 PROCEDURES

- .1 Notify appropriate agency and Consultant 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.

1.7 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, Owner 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.

1.8 REPORTS

- .1 Submit copies of inspection and test reports to Consultants and Owner.
- .2 Provide copies to subcontractor of work being inspected or tested, and manufacturer or fabricator of material being inspected or tested.

1.9 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested and those required by law of Place of Work.

1.10 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Consultant. Coordinate on Site.
- .3 Prepare mock-ups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups 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.
- .5 Remove mock-up at conclusion of Work or when acceptable to Consultant. Mock-ups may remain as part of Work if approved by Consultant.

1.11 MILL TESTS

- .1 Submit mill test certificates as requested.

1.12 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
- .2 Refer to Section 01 78 00 for definitive requirements.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.4 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.5 WATER SUPPLY

- .1 Owner will provide continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .3 Permanent water supply system installed under this Contract may be used for construction requirements with prior approval of Owner provided that guarantees are not affected. Make good damage.

1.6 TEMPORARY POWER AND LIGHT

- .1 Owner will provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.
- .2 If additional power is required, arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
- .3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

1.7 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary communication necessary to complete the project.

1.8 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.9 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction or that complies with EPA 832/R-92-005, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
- .1 CCDC 2-2020
- .2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be graveled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding (including overhead protection) in accordance with CAN/CSA-S269.2., local and provincial authorities having jurisdiction.

1.5 SITE ENCLOSURE

- .1 Protect public and workers from injury.
- .2 Provide and maintain required barricades, guardrails, and guardlights in accord with applicable regulations.
- .3 For the duration of project, provide heavy-duty steel construction fence as indicated on the site plan. Provide lockable gate for access to work area and material deliveries. Lock for gated

access area to be provided by Owner.

1.6 ENCLOSURE OF STRUCTURE

- .1 Provide temporary weathertight enclosures and protection for exterior openings until permanently enclosed.
- .2 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .3 Design enclosures to withstand wind pressure and snow loading.

1.7 TEMPORARY STAIRS

1. Furnish and maintain all equipment such as stairs, ladders, ramps, scaffolds, swing stages, runways, derricks, chutes, elevators, etc. as required for proper execution of work.
2. Construct and maintain scaffolding in rigid, secure and safe manner. Erect scaffolding independent of walls. Remove promptly when no longer required.
3. Provide all necessary temporary barricades, fencing, guardrails, night lights, overhead protection and barriers as necessary for the work.
4. Where such structures are of a complicated nature, employ the services of a Registered Professional Engineer to design such scaffolding, framework, or other temporary supports.

1.8 HOISTING

- .1 Provide, operate and maintain hoists and/or cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists / cranes to be operated by qualified operator.

1.9 SITE STORAGE/LOADING

- .1 Refer to CCDC 2
- .2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .3 Provide in an area designated by the Owner adequate weathertight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.
- .4 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.10 CONSTRUCTION PARKING

- .1 Parking may be permitted on site with Owner's permission.
- .2 Provide and maintain adequate access to project site.
- .3 Clean runways and taxi areas where used by Contractor's equipment.

1.11 SECURITY

- .1 If required, provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.12 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.13 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.14 SANITARY FACILITIES

- .1 Owner will designate sanitary facilities for work force.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times.
- .9 Remove, upon completion of work.

1.16 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

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 AND STEEL FENCE

- .1 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
- .2 Erect temporary site enclosure using new 2.4 m high steel fence ("Quick Fence" or equal). Provide one lockable truck gate. Maintain fence in good repair.
- .3 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs, and where required.
- .2 Provide as required by governing authorities and as directed by Architect.

1.5 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure.

1.6 DUST TIGHT SCREENS AND FIRE RATED PARTITIONS

- .1 Provide dust tight screens insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Provide dust tight screens insulated partitions between Owner occupied areas and construction activities and as shown on the drawings.
- .3 All partitions to be 1hr fire rated partitions.

- .4 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 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 Confirm with Consultant locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
.1 CCDC 2-2020 .
- .2 Within text of each specifications section, reference may be made to reference standards.
- .3 Conform to these reference standards, in whole or in part as specifically requested in specifications. Conform to latest date of issue of referenced standards in effect on date of submission of Bids (even if it differs from the date in the spec).
- .4 If there is question as to whether products or systems are in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.
- .5 Cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

- .1 Refer to CCDC 2.
- .2 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .3 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .4 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.
- .5 Should disputes arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .7 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 Immediately upon issuance of Purchase Order, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

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

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction Consultant.
- .9 Touch-up damaged factory finished surfaces to Consultant's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

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

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 will 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.
- .4 **Include for all labour and material (beyond the requirements of tender documents) required by the manufacturer for proper installation.**

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. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Consultant reserves right to require

dismissal from site, workers deemed incompetent or careless.

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

1.8 CO-ORDINATION

- .1 Ensure co-operation 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 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. Co-ordinate 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 Prevent overloading of parts of building. Do not cut, drill or sleeve 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.
- .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.
- .3 Locate all existing utilities before commencing work.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2020.
- .2 Owner's identification of existing survey control points and property limits.

1.2 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practice in Province of Ontario.

1.3 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice Consultant.
- .4 Report to Consultant when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

- .1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Stake slopes and berms.
- .5 Establish pipe invert elevations.
- .6 Stake batter boards for foundations.
- .7 Establish foundation column locations and floor elevations.
- .8 Establish lines and levels for mechanical and electrical work.

1.5 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
- .2 Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Consultant.

1.6 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Consultant of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment.

1.7 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

1.8 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit name and address of Surveyor to Consultant.
- .2 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

1.9 SUBSURFACE CONDITIONS

- .1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

END OF SECTION

PART 1- GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.2 MATERIALS

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

1.3 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 are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching 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 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Where warranty is still valid, employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.
- .13 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .14 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

END OF SECTION

PART 1- GENERAL

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by 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 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.
- .7 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 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 all waste products and debris caused by the work and leave work area clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Owner. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

- .8 Clean lighting reflectors, lenses, and other lighting surfaces. Lenses to be cleaned inside and out.
- .9 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .10 Clean floor in preparation for sealing and waxing by Owner.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .13 Remove dirt and other disfiguration from exterior surfaces.
- .14 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .15 Sweep and wash clean paved areas.
- .16 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .17 Clean roofs, downspouts, and drainage systems.
- .18 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .19 Use magnetic sweeping tools in all exterior work areas.

END OF SECTION

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PART 1- GENERAL

1.1 REGULATORY AGENCIES

- .1 The Ontario Ministry of Environment (OME) in AGENCIES accordance with Section 7 of Ontario Regulation 103/94 requires a source separation program for the waste that will be generated in the construction or demolition of a structure.
- .2 The source separation program required shall:
 - .1 Deal separately with each of the categories of waste set out in Part III of the Schedule that have been source separated from other kinds of waste and also from each other category of waste in Part III; or
 - .2 Provide for removal from the building site of any commingled categories of waste set out in Part III of the Schedule and for the immediate separation of such waste from all other kinds of waste and also from each category of waste in Part III, at
 - .1 permanent premises of the person undertaking the construction project
 - .2 permanent premises of the person on whose behalf the construction project is undertaken or
 - .3 a waste disposal site operating under the authority of a certificate of approval
- .3 The source separation program shall be implemented before construction work begins on site.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Prepare and submit a Waste Reduction Workplan. Describe management of construction wastes. Identify materials which can be recycled, reused and indicate methods proposed for reducing, reusing and recycling wastes.

1.3 WASTE COLLECTION AND DISPOSAL

- .1 Separate and salvage materials suitable for reuse and/or recycling from general waste stream.
- .2 Provide on site facilities for collection, handling and storage of anticipated quantities of reusable and/or recyclable materials.
- .3 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .4 Collect, handle, store on site and transport off site, salvaged materials, salvaged for reuse and/or recycling in separate condition. Transport to authorized reuse/recycling location.
- .5 Separate non salvageable materials from salvaged items. Transport and deliver non salvageable

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items to licensed disposal facility.

- .6 Burying, burning, selling waste materials on site is prohibited.
- .7 Disposals of liquid wastes into waterways, sewers is prohibited.
- .8 Unless specified otherwise, materials for removal become Contractor's property.
- .9 Clean up work, storage and waste collection areas as work progresses.

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 REFERENCES

- .1 OAA/OGCA Document 100.
- .2 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2020, Stipulated Price Contract.
- .3 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Consultant's inspection.
 - .2 Consultant's Inspection:
 - .1 Consultant and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
 - .4 Certificates required by ESA, Municipal Authorities, Provincial Authorities, TSSA, etc: submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.
 - .6 Commissioning of mechanical systems: completed and copies of final Commissioning Report submitted to Consultant.
 - .7 Work: complete and ready for final inspection.
- .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Consultant, and Contractor.
 - .2 When Work incomplete according to Consultant, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when Consultant considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to 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:
 - .1 When Consultant considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

- .2 Refer to CCDC 2: when Work deemed incomplete by Consultant, complete outstanding items and request re-inspection.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

.1 OPERATION AND MAINTENANCE MANUALS

- .1 On completion of project, prepare for the UCDSB One (1) copy of an Operations Data and Maintenance Manual and One Thumb Drive, made up as follows:
 - .1 Bind data in a vinyl hard covered, 3 ring loose leaf binder for 8-1/2" X 11" size paper.
 - .2 Enclose title sheet, labelled "Operation Data and Maintenance Manual", project name, date and list of contents. Provide a title on the Cover and a tile on the vertical edge on all binders.
 - .3 Organize the contents into applicable sections of work to parallel the project specification break-down. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .2 The following information plus the data specified will be included:
 - .1 Maintenance instructions for finished surfaces and materials.
 - .2 Copies of hardware and paint schedules.
 - .3 Description, operation and maintenance instructions for equipment and systems, including a complete list of equipment and parts lists. Indicate the nameplate information such as make, size, capacity and serial number.
 - .4 Names and addresses of subcontractors and suppliers, including names and phone numbers of contact personnel and 24-hour emergency telephone contacts.
 - .5 Guarantees, warranties and bonds showing:
 - .6 The name and address of the project.
 - .7 Guarantee commencement date (date of Final Certificate for Payment).
 - .8 Duration of guarantee.
 - .9 Clear indication of what is being guaranteed and what remedial action will be taken under the guarantee.
 - .10 Signature and seal of Contractor.
 - .11 Additional materials and products used in the project, listed under various Sections showing the names of the manufacturers and sources of supply.
- .3 The Contractor's Submittal:
 - .1 Provide One (1) copy of the information and data. Each set shall be organized and presented in accordance with the requirements of 1.1 and 1.2 above.
 - .2 Operation Data and Maintenance Manuals are part of the Contract.
\$ 5,000 will be held in a fund until all documents have been received and approved by the Consultant. Contractor to include this value, in the Progress Draw breakdown.
 - .3 Neatly type lists and notes. Use clear drawings, diagrams and manufacturers' literature.
 - .4 Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.
 - .5 Include a complete set of warranties and maintenance service agreements.
 - .6 Include the requirements of all Divisions of the specifications in compiling the maintenance manuals.

2 WARRANTIES

- .1 Provide duplicate notarized copies of warranties called for in the applicable specifications Sections.
- .2 Refer to individual sections of the specifications for specific requirements of the warranties.
- .3 Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
- .4 Provide Table of Contents for inclusion in the Operation & Maintenance Manual specified herein.
- .5 Submit warranties immediately after the issuance of the Certificate of Substantial Completion, to facilitate

release of holdback monies.

- .6 For items of work delayed beyond the date of Substantial Performance of the Work, provide an updated submittal within ten (10) days after acceptance, listing the date of acceptance as the start of the warranty period.
- .7 If the validity of an extended warranty is related to proper maintenance and servicing of equipment, etc., provide full details in maintenance manuals.

3 MAINTENANCE SERVICE

- .1 Furnish service and maintenance of components indicated in specification sections for the specified time period commencing on the date of Substantial Completion.
- .2 Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- .3 Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- .4 Maintenance service shall not be assigned or transferred to any agent or Subcontractor without the Project Manager's prior written consent.

4 AS-BUILT AND PROJECT RECORD DRAWINGS

- .1 As-Built Drawings:
 - .1 The contractor is to retain one set of full size prints for recording all as-built conditions every month.
 - .2 Maintain As-Built Drawings and record accurately significant deviations from the Contract Documents caused by site conditions and changes ordered by the Consultant.
 - .3 Mark changes in red ink.
 - .4 Where applicable, record the following information:
 - .1 Depths of various elements of foundations in relation to finish ground floor.
 - .2 Horizontal and vertical locations of underground utilities and appurtenances referenced to a permanent surface improvement.
 - .3 Locations of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by Change Order, Additional Instruction or order for minor change in the Work.
 - .5 Each Subcontractor shall provide the Contractor with the as-built information applicable to the work of that subcontract.
- .2 Project Record Drawings:
 - .1 At the completion of the project and prior to final inspections submit the As-Built Drawings to the Consultant and the specialist sub-consultants for the production of Project Record Drawings by revising the electronic drawing files to incorporate the as-built information provided by the Contractor.
 - .2 Contractor's Submittal: Project Record Drawings are part of the Contract. Note \$ 5,000 will be retained until all documents have been satisfactorily completed & received by the Project Manager.

5 SPARE PARTS AND MAINTENANCE MATERIALS

.1 Quality:

- .1 Spare parts, maintenance materials and special tools provided shall be new, not damaged or defective, and of the same quality and manufacture as materials and products provided in the Work.
- .2 If requested, furnish evidence as to type, source and quality of products provided.
- .3 Defective materials and products will be rejected, regardless of previous inspections. Replace materials and products at no additional cost to the Contract.

.2 Storage, Handling and Protection:

- .1 Store spare parts, maintenance materials and special tools in a manner which will prevent damage, or deterioration.
- .2 Store in original and undamaged condition with the manufacturer's seals 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 no additional cost to the Contract

.3 Spare Parts:

- .1 Provide spare parts in quantities specified in the individual specification Sections.
- .2 Provide items of the same manufacture and quality as items in the Work.
- .3 Deliver to the Project Site, place and store where directed by the Project Manager.
- .4 Receive and catalogue all items. Submit an inventory listing to the Consultant. Include the accepted listings in the Operation and Maintenance Manual.
- .5 Obtain receipts for delivered products and submit receipts prior to final payment.

.4 Maintenance Materials:

- .1 Provide maintenance and extra materials in quantities specified in individual specification Sections.
- .2 Provide items of same the manufacture and quality as items in the Work.
- .3 Provide materials from the same production run as installed materials.
- .4 Deliver to the Project Site, place and store where directed by the Project Manager.
- .5 Submit an inventory listing in the Operation and Maintenance Manuals.
- .6 Obtain receipts for delivered products and submit receipts prior to final payment.

.5 Special Tools:

- .1 Provide special tools in quantities specified in the individual specification Sections.
- .2 Provide items with tags identifying their function and the equipment with which they are associated.
- .3 Deliver to the Project Site, place and store where directed by the Project Manager.
- .4 Receive and catalogue all items. Include the accepted listings in the Operation and Maintenance Manual specified herein.

END OF SECTION

PART 1- GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of substantial performance.
- .2 Owner: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation:
 - .1 Verify conditions for demonstration and instructions comply with requirements.
 - .2 Verify designated personnel are present.
 - .3 Ensure equipment has been inspected and put into operation.
 - .4 Ensure testing, adjusting, and balancing has been and equipment and systems are fully operational.
- .4 Demonstration and Instructions:
 - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment.
 - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
 - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
 - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.
- .5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment is adequate.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, Owner's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of each demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.3 QUALITY ASSURANCE

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
 - .1 Instruct Owner's personnel.
- .2 Provide written report that demonstration and instructions have been completed.

END OF SECTION

PART 1- GENERAL

1.1 SECTION INCLUDES

- .1 Partial Demolition of Existing Features throughout the existing building and site.
- .2 Methods and procedures for demolishing, salvaging, recycling and removing items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.
- .3 Physical detachment of materials from structure and may include: prying, pulling, cutting, unscrewing.
- .4 Removal and disposal of all demolition waste.
- .5 Work described in Section 01 73 00 Execution

1.2 REFERENCES

- .1 National Building Code of Canada (NBC), Part 8 - Safety Measures at Construction and Demolition Sites (2005) and with local authority having jurisdiction.
- .2 CSA International: CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water: EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 GENERAL INTENT

- .1 Demolition of building features and structures are demolished, and the debris is removed such that:
 - .1 the demolition is completed in a manner and within the timeframes established in the Project Schedule
 - .2 the surfaces remaining after demolition are safely filled and free of protrusions and abrupt edges.
 - .3 if the equipment is removed, then all the equipment, the electrical, mechanical, and process systems equipment related to the equipment will be removed from the remainder of the Buildings in an acceptable manner so as not to damage the buildings.
 - .4 all demolition debris has been removed and disposed of in accordance with applicable law.
 - .5 below grade structures and equipment are to be opened, metal and debris removed, and the resulting holes filled and made safe.
 - .6 Any disturbed adjacent surfaces shall be repaired.
 - .7 the equipment will be removed through existing openings or through openings created in preparation for new curtain walls. No additional openings to be made to building envelope. When removing the equipment, all of the exterior electrical, mechanical, and process systems equipment related to the equipment will also be removed.
- .2 Demolition includes, but is not limited to:
 - .1 Removal of doors, windows and frames, interior partitions as required to accommodate

- new construction.
- .2 Removal of exterior site features interfering with new construction such as sidewalks, retaining walls, underground pipes, utilities, etc.
- .3 Removal of interior finishes adjacent to demolition to the extent of nearest "natural break" (i.e. floor tile, material seams, room corners, doorways, etc.) which allow for installation of new finishes.
- .4 Removal of masonry for the support of new steel framing members and lintels.
- .5 Removal of pipes, conduits, ducts, other mechanical and electrical work as required to accommodate new construction.
- .6 Remove all exposed conduit and wiring back to the panel from which it is served. Mark all disassociated breakers "spare". Unless otherwise noted, the Contractor shall fill and patch all wall, floor, and ceiling openings resulting from this demolition work with materials and finishes identical to adjacent materials and finished.
- .7 Unless otherwise noted, remove all wiring devices, fixtures, controls, circuitry (conduit and wiring), etc., made obsolete by the demolition within or around the building.
- .8 The Contractor shall relocate all existing piping, circuitry (conduit and wiring), ductwork, etc., which impedes the installation of new materials and equipment, unless otherwise noted.
- .9 Demolish, remove, demount, and disconnect the following:
 - .1 Inactive and obsolete piping, fitting and specialties, equipment, ductwork, controls, fixtures, and insulation.
 - .2 Piping and ducts embedded in floors, wall, and ceiling may remain if such materials do not interfere with new installation. Remove materials above accessible ceilings. Drain and cap piping and ducts allowed to remain.

1.4 PRE-BID SURVEY

- .1 Conduct a complete and comprehensive survey of existing conditions to identify all features to be demolished. In submitting the Bid for this project the Contractor acknowledges that he/she have inspected the site and have made their own assessment of the prevailing site conditions, including the position of all existing services, the extent of all demolition, etc., the nature of the access together with the requirements of all other works necessary to facilitate the completion of the contract.
- .2 Verify that utilities have been disconnected and capped.
- .3 Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- .4 Survey the condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.
- .5 Perform surveys as the Work progresses to detect hazards resulting from demolition activities.
- .6 Owner will provide adequate access to the building to all contractors in order to carry out the pre-bid survey. Contact Owner to arrange access to school site

1.5 SITE CONDITIONS

- .1 Review "Designated Substance Report" and take precautions to protect workers and environment.
- .2 If material resembling spray or trowel-applied asbestos or other designated substance be encountered, stop work, take preventative measures, and notify the Owner immediately. Proceed

only after receipt of written instructions have been received from the Owner.

- .3 Notify Owner before disrupting building access or services.
- .4 Remove all base structures to be deconstructed on their condition at time of site visit during Bid period. Be responsible for provision of services required for deconstruction. Conduct comprehensive survey of items to be demolished.
- .5 Employ necessary means to assess site conditions and structures to determine quantity and locations of hazardous materials.
- .6 Investigate site and structures to determine dismantling, processing and storage logistics required prior to beginning of Work.
- .7 Develop strategy for deconstruction to facilitate optimum salvage and disposal.

PART 2 - EXECUTION

2.1 EXAMINATION

- .1 Inspect building and site with and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
 - .1 Immediately notify Consultant and utility company concerned in case of damage to any utility or service, designated to remain in place.
 - .2 Immediately notify the Consultant should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

2.2 PREPARATION

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

2.3 PROTECTION

- .1 Prevent movement, settlement, or damage to adjacent structures, utilities, landscaping features, parts of building to remain in place, etc. Provide bracing and shoring required.

- .2 Keep noise, dust, and inconvenience to occupants to minimum.
- .3 Protect building systems, services and equipment.
- .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
- .5 Take precautions to guard against damage to adjacent work. Be liable for any damage or injury caused.
- .6 Ensure safe passage around and through area of demolition.
- .7 Protect temporarily suspended work that is without continuous supervision to prevent access by unauthorized persons.
- .8 Do Work in accordance with Section 01 35 29 - Health and Safety Requirements.

2.4 DEMOLITION

- .1 Remove items as indicated.
- .2 Removal of Pavements, Curbs and Gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials.
- .3 Remove parts of existing building to permit new construction.
- .4 Trim edges of partially demolished building elements to tolerances to suit future use.
- .5 Carry out demolition work in a manner to least inconvenience adjacent occupied building area.
- .6 Disconnect all electrical and telephone service lines in the areas to be demolished. Post warning signs on all electrical lines and equipment which must remain energized to serve other areas during period of demolition. Disconnect electrical and telephone service lines in demolition areas to the requirements of local authority having jurisdiction.
- .7 Disconnect and cap all mechanical services in accordance with requirements of local authority having jurisdiction. Natural gas supply lines shall be removed by the gas company or by a qualified tradesman in accordance with gas company instructions.

2.5 REMOVAL FROM SITE

- .1 Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's expense.
- .2 Transport material designated for alternate disposal in accordance with applicable regulations.
- .3 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

2.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Remove debris, trim surfaces and leave work site clean, upon completion of Work.
- .4 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants and building materials.
- .5 Remove all tools and equipment from site.
- .6 Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent

construction or surfaces soiled or damaged by selective demolition work.

- .7 Refer to demolition drawings and specifications for items to be salvaged for reuse.

END OF SECTION

1 GENERAL

1.1 RELATED WORK

- | | | |
|----|--------------------------|------------------|
| .1 | Concrete Reinforcement | Section 03 20 00 |
| .2 | Cast-in-Place Concrete | Section 03 30 00 |
| .3 | Concrete Floor Finishing | Section 03 35 00 |
| .4 | Structural Steel | Section 05 12 00 |

1.2 REFERENCE STANDARDS

- .1 Do concrete formwork in accordance with CAN/CSA-A23.1-19 and CSA Standard S269.1-16 (R2021), except where specified otherwise.

2 PRODUCTS

2.1 MATERIALS

- .1 Formwork materials:
- .1 For concrete not designated 'Architectural'; use wood and wood product formwork materials to CSA-0121, CAN/CSA O86.19, CSA 0437 Series and CSA-0153-19 (R2024).
 - .2 For 'Architectural' concrete; use formwork materials to CAN/CSA-A23.1.
 - .3 Tubular column forms; round, spirally wound laminated fiber and vinyl lined to eliminate projecting spiral ridges. Align seams to architects' instructions, grind smooth as required by architect.
- .2 Form ties:
- .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
 - .2 For 'Architectural' concrete; use snap ties complete with plastic cones and light gray concrete plugs.
- .3 Form liner:
- .1 Plywood: medium density overlay Canadian Softwood Plywood to CSA O121 –17 (R2022)
 - .2 Form release agent: non-toxic, biodegradable, low VOC, chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.
- .4 Sealant: to Section 0 79 00 – Joint Sealers.

3 EXECUTION

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and column / wall centres before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Construct forms to produce finished concrete conforming to shape, dimensions, locations, and levels indicated within tolerances required by CAN/CSA-A23.1-19.

- .3 Obtain Engineer's permission before framing openings not indicated on drawings.
- .4 Align form joints and make watertight.
- .5 Use templates for anchor bolts and carefully align reinforcement and dowels.
 - .1 Anchor bolts are to be placed under the supervision of trade supplying the anchor bolts prior to placing concrete.
 - .2 Anchor bolts are to be securely fastened to prevent displacement during placing of concrete or finishing.
- .6 Cast in plates are to be accurately located and secured to formwork or reinforcing. Provide means of restraining plate to prevent movement during placing of concrete.
 - .1 Cast in plates are to be placed under the supervision of the trade supplying the plate prior to placing of concrete.
- .7 Form chases, slots, openings, drips, recesses expansion and control joints as indicated.
- .8 Use new Formply or a Masonite liner and avoid form ties in areas exposed to view.
- .9 Clean formwork in accordance with CAN/CSA-A23.1-19, before placing concrete.
- .10 Use 25 mm chamfer strips on external corners
- .11 Leave formwork of concrete not exposed to view in place for 24 hours after placing concrete. Formwork for concrete exposed to view to be left in place for 48 hours. After form removal cover and protect concrete for the remainder of the initial curing period.

END OF SECTION

1 GENERAL

1.1 RELATED WORK

- .1 Cast-in-Place Concrete Section 03 30 00
- .2 Structural Steel Section 05 12 00

1.2 REFERENCES

- .1 ANSI/ACI 315-80, Details of Concrete Reinforcement.
- .2 ACI 315R-80, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
- .3 Reinforcing steel manual of standard practice - Reinforcing Steel Institute of Ontario.
- .4 CAN/CSA-A23.1/2-19, Concrete Materials and Methods of Concrete Construction.
- .5 CSA-A23.3-19, Design of Concrete Structures for Buildings.
- .6 CSA G30.18-21, Carbon Steel Bars for Concrete Reinforcement.
- .7 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction
- .8 Reinforcing Steel Institute of Canada: Reinforcing Steel Manual of Standard Practice
- .9 ASTM A1064/A1064M: Standard Specification of Carbon Steel Wire and Welded Wire Reinforcement.

1.3 SOURCE QUALITY CONTROL

- .1 Upon request inform Engineer of proposed source of material to be supplied.
- .2 Upon request from the Engineer, provide consultant with a certified mill test report of the reinforcing steel, including physical and chemical analysis.

1.4 QUALITY ASSURANCE

- .1 Welding of reinforcing steel to be performed by welders certified under CSA W186

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 30 00.
- .2 Shop drawings consist of bar bending details, lists and placing drawings.
- .3 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and mechanical splices, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacing and location of chairs, spacers, and hangers to facilitate placing of steel as shown. Do drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Ontario.

- .1 Identify additional bars, as required, to provide support for cast in structural elements, or where

reinforcing steel is not readily supported by reinforcing as detailed for the final structure.

- .4 Design and detail lap lengths and bar development lengths to CSA-A23.3-19, unless otherwise indicated.
- .5 Approval applies to general arrangement and does not relieve responsibility for making this work complete, accurate and conforming to drawings and specifications.

2.1 MATERIALS

- .1 Reinforcing steel: billet steel, grade 400, deformed bars to CSA G30.18-21
 - .1 Reinforcing to be weldable grade as required.
- .2 Welded steel wire fabric: to ASTM A1064/A1064M
- .3 Chairs, bolsters, bar supports, spacers: to CSA A23.1-19. All materials cast into slabs to be non-corrosive.
- .4 Mechanical Splices: subject to the approval of the engineer. Any mechanical splices to be capable of transferring 120% of rebar tension capacity.

2.2 FABRICATION

- .1 Fabricate reinforcing in accordance with CSA-A23.1-19 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.
- .2 Obtain Engineer's approval for locations of reinforcement splices other than shown on placing drawings.
- .3 Upon approval of Engineer, weld reinforcement in accordance with CSA W186-21.
- .4 Ship bundles of bar reinforcement clearly identified in accordance with bar bending details and lists.

3 EXECUTION

3.1 FIELD BENDING

- .1 Do not field bend reinforcement except where indicated or authorized by Engineer.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on approved placing drawings and in accordance with CSA-A23.1-19.
- .2 All welded wire mesh, if noted on drawings in slab on grade or slab on deck is to be chaired at mid depth of slab. Lifting of mesh during concrete pour is not acceptable.
- .3 Prior to placing concrete, obtain Engineer's approval of reinforcing steel and position.

- .4 Provide all supporting reinforcing bars/ chair bars as required to facilitate the placement of reinforcing as shown on the structural drawings. If additional bars are required, other than structural bars, to facilitate placement of reinforcing or other cast in elements they are to be provided.
- .5 All reinforcing and cast in elements are to be securely anchored to prevent displacement from construction activities or placing of concrete.

END OF SECTION

1 GENERAL

1.1 RELATED WORK

- | | | |
|----|-------------------------|------------------|
| .1 | Concrete Formwork | Section 03 10 00 |
| .2 | Concrete Reinforcement | Section 03 20 00 |
| .3 | Concrete Floor Finishes | Section 03 35 00 |
| .4 | Polished Concrete | Section 03 35 03 |
| .5 | Vapour Barriers | Section 07 26 00 |

1.2 REFERENCE STANDARDS

- .1 Do cast-in-place concrete work in accordance with CSA A23.1-19, and testing in accordance with CSA-A23.2.19 except where specified otherwise.
- .2 ASTM C494/C494M-17, Standard Specification for Chemical Admixtures for Concrete

1.3 QUALITY ASSURANCE

- .1 Concrete supplier to have valid "Certificate of Ready Mixed Concrete Production Facilities" issued by the relevant Ready Mix Concrete Associate (RMCA). Provide copy of certificate to the consultant.

1.4 COORDINATION WITH OTHER TRADES

- .1 Work must be carried out in a coordinated fashion with other trades including but not limited to formwork, concrete finishing, reinforcing, structural steel, mechanical trades. Materials and elements must be coordinated for interference and timing to ensure they are provided to site in a timely manor so as to not hold up site activities.
- .2 Contractor is to review Structural, Architectural, Civil, Mechanical Engineer, M&E Contractor drawings for all slab & wall penetrations, openings and sleeves. Coordinate sizes and exact locations of penetrations/ openings, and provide framing as per structural typical details. If location or size conflicts are found, coordinate with M&E Engineer and Contractor for resolution.
- .3 Step footings as required for services entering the building, pipes are not to be below footings and are to be sleeved through foundation walls.
- .4 No sleeves are to be placed below columns or concentrated loads such as beams, unless specifically detailed by the engineer.
- .5 Any miscast or omitted openings or sleeves are to be corrected at the expense of the contractor. It is the responsibility of the contractor to scan top and bottom of all slabs, with bottom bar marks transposed to top of slab, and lay out proposed relocations to avoid reinforcing steel and structural elements. Provide minimum 48 hour notice to the engineer for all coring reviews. Any proposed relocations may be rejected by the engineer and alternative solutions are to be provided at the expense of the contractor.

2 PRODUCTS

2.1 MATERIALS

- .1 Portland cement: to CAN/CSA-A3000-23

- .2 Water: to CSA-A23.1-19.
- .3 Aggregates: to CAN/CSA-A23.1-19. Coarse aggregates to be normal density.
- .4 Air entraining admixture: to CAN3-A266.1-M78.
- .5 Chemical admixtures: to CAN3-A266.2-M78 (ASTM C494). Engineer to approve accelerating or set retarding admixtures during cold weather placing.
- .6 Non-premixed dry pack grout: composition on non-metallic aggregated Portland cement with sufficient water for mixture to retain its shape when made into a ball by hand and capable of development compression strength of 50 MPa at 28 days.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2. Minimum compressive strength: 40 MPa at 28 days.
- .8 Curing Compound: To CSA-A23.1-19.
- .9 Pre moulded joint fillers: Bituminous impregnated fibreboard: to ASTM D1751-91.
- .10 Expanding waterstops: Waterstop RX manufactured by Volclay Waterproofing or equivalent
- .11 Concrete Hardener. LIQUI-HARD Concrete Densifier and Chemical Hardener by W.R. MEADOWS
- .12 Sawcut joint fillers. EUCO QWICKJOINT UVR or Sika Loadflex.
- .13 Terrafox, or approved equivalent curing blanket.
- .14 Crystalline Waterproofing Additive: Xypex Admix C-500 or approved alternative.

2.2 CONCRETE MIXES

- .1 Proportion of normal density concrete in accordance with CSA-A23.1-19, to give the following properties for exterior non-structural concrete used for slabs, curbs, sidewalks & curbs on foundation walls adjacent to sidewalks & entrances.
 - .1 Cement: use Type GU or GUb Portland cement.
 - .2 Minimum compressive strength at 28 days: 32 MPa.
 - .3 Class: C-2
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Air Entrainment: 5 to 8%.
 - .6 Slump at time and point of discharge: 100 mm.
- .2 Proportion of normal density concrete in accordance with CSA-A23.1-19, to give the following properties for exterior foundation walls / curbs.
 - .1 Cement: use Type GU or GUb Portland cement.
 - .2 Minimum compressive strength at 28 days: 25 MPa.
 - .3 Class: F-2
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Air Entrainment: 4 to 7%.
 - .6 Slump at time and point of discharge: 100 mm.
- .3 Proportion of normal density concrete in accordance with CSA-A23.1-19, to give the following properties for slab on grade.
 - .1 Cement: use Type GU or GUb Portland cement.
 - .2 Minimum compressive strength at 28 days: 25 MPa.

- .3 Class: N-CF (No Air)
- .4 Nominal size of coarse aggregate: 20 mm.
- .5 Slump at time and point of discharge: 100 mm.
- .4 Proportion of normal density concrete in accordance with CSA-A23.1-19, to give the following properties for all other concrete.
 - .1 Cement: use Type GU or GUb Portland cement.
 - .2 Class: N
 - .3 Minimum compressive strength at 28 days: 25 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 100 mm.
- .5 Use of calcium chloride or admixtures containing calcium chloride, not permitted.
- .6 Slumps are based on CSA standards, contractor and concrete supplier are to account for weather mixes as required, method of placement such as pumping and rebar congestion. Adjust mix slump as required to suite site conditions.
- .7 Contractor and supplier are to adjust mixes as require to suite site conditions at time of placing, mass of concrete placement and heat of hydration. Account for weather temperature during initial curing and take appropriate precautions for hot and cold conditions.

3 EXECUTION

3.1 ACTION AND INFORMATION SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Minimum 2 weeks prior to starting concrete work, submit all concrete mix designs, and indicate where each concrete mix is to be used.
- .3 Minimum 2 weeks prior to placing concrete, submit drawings showing proposed locations of all construction and control joints (including wall and slab on grade and slab on deck joints) for Consultant review and approval.
- .4 Minimum 2 weeks prior to placing concrete, provide composite sleeving drawings showing sleeves required by all trades for consultant review and approval.
- .5 Minimum 2 weeks prior to placing concrete, provide composite layout drawings showing all cast in place pipes and conduits for consultant review and approval.
- .6 Concrete pours: provide accurate records of all concrete pours marked on a set of Structural Drawings.
- .7 Flatness and levelness: when requested, submit measurements of slab tolerances for each concrete pour.
- .6 Minimum submission requirements for each concrete mix design shall include the following:
 - .1 Minimum specified compressive strength at 28 days (or at the time specified on drawings).
 - .2 Maximum aggregate size.
 - .3 Aggregate type (if not normal density).

- .4 Concrete density range, wet and dry (if not normal density).
- .5 CSA exposure class.
- .6 Cement type (if not type GU).
- .7 Percentage and type of supplemental cementing materials.
- .8 Maximum water/cementitious materials ratio.
- .9 Slump at point of discharge.
- .10 Assumed method of placement of concrete.
- .11 Architectural requirements (colour of cement and aggregate, if applicable).
- .12 Maximum time from batching to placing concrete (if retarding admixtures are used)

3.2 WORKMANSHIP

- .1 Obtain Engineer's approval before placing concrete. Provide 48 h notice prior to placing of concrete or closing of wall forms.
- .2 Prior to placing slab on grade, provide geotechnical confirmation that that subgrade and backfill meet specifications and are free of frost and surface water.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain Engineer's approval of the proposed method for protection of concrete during placing and curing in adverse weather.
- .5 Maintain accurate records of poured concrete items to indicate the date, location of pour, quality, air temperature, and test samples were taken.
- .6 Do not place a load upon new concrete until authorized by Engineer.

3.3 INSERTS

- .1 Set sleeves, ties, and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 mm X 100 mm not indicated on structural drawings must be approved by Engineer.
- .2 Do not eliminate or displace reinforcement to accommodate the hardware. If inserts cannot be located as specified, obtain approval of modifications from Engineer before placing of concrete.
- .3 Check locations and sizes of sleeves and openings are shown on structural drawings with architectural, mechanical and electrical drawings. Notify the engineer of any discrepancies in size or location shown for approval.
- .4 Anchor bolts:
 - .1 Place anchor bolts to templates under supervision of trade supplying anchors prior to placing concrete.
 - .2 Anchor bolts are to be securely fastened to prevent displacement during placing of concrete or finishing.
- .5 Waterstops

- .1 Provide vertical water stop at each foundation wall joint.
- .2 Review architectural drawings for any additional water stop locations.

3.4 PLACING GROUT UNDER BASE PLATES AND BEARING PLATES

- .1 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations.
- .2 Provide 100% contact over grouted area.
- .3 Grout column base plates and beam bearing plates as soon as steelwork is completed and plumbness is verified.
- .4 Do not add load on steelwork until grouting is completed and grout strength has reached at least 25 MPa.

3.5 FINISHING

- .1 Finish concrete in accordance with CAN/CSA-A23.1.19.
- .2 Concrete exposed to public view to have a smooth-form finish unless specified otherwise.

3.6 WATERSTOPS

- .1 Install water stops to provide continuous water seal. Do not distort or pierce water stop in such a way as to hamper performance. Do not displace reinforcement when installing water stops. Use equipment to manufacturer's requirements to field splice water stops. Tie water stops rigidly in place.
- .2 Follow the manufacturer's instructions and recommendations.

3.7 JOINT FILLERS

- .1 Furnish filler for each joint in a single piece for depth and width required for joint, unless otherwise authorized by Engineer. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastenings. The acceptable product is Sika Loadflex or EUCO QWICKJOINT UVR.
- .2 Locate and form isolation joints as indicated. Install joint filler.
- .3 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from the bottom of slab to within 1/2 in. of finished slab surface unless indicated otherwise.

3.8 CONCRETE HARDENER

- .1 Refer to room finish schedule for rooms where exposed concrete floor slab must receive hardener treatment.
- .2 Hold pre-construction meeting with hardener technical representative and finisher to ensure proper application, curing and protection.

3.9 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Owner in accordance with CSA-A23.1.19.
- .2 Costs of tests will be paid for as specified in Sections 01 29 83.

- .3 Concrete testing frequency to be in accordance with CSA A23.1/2. Engineer can require additional test cylinders during cold weather concreting. Cure cylinders on job sites under the same conditions as concrete which they represent.
- .4 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

3.10 SAWCUTTING OF CONTROL JOINTS

- .1 In slab-on-grade construction, perform and complete sawcutting of all control joints no later than 8 hours after concrete placement and as soon as concrete can support the workers and equipment.
- .2 Configuration and extent of sawcut control joints shall be as indicated on the drawings.
- .3 Sawcutting to be performed using power driven abrasive or diamond blades. Depth of sawcuts shall be as indicated on drawings.
- .4 See notes on structural drawings for maximum spacing requirements. Saw cut pattern to be square in nature, with aspect ratio of sides no more than 1:1.5. Do not create "L" or "T" shaped joint intersections.

3.11 DEFECTIVE CONCRETE

- .1 Remove and replace excessive honeycomb, embedded Concrete Finish debris or cracked concrete slabs as directed by the Consultant.

3.12 CRACKS IN GROUND FLOOR SLAB OR SLAB ON DECK

- .1 Extensive cracking of ground floor slab or slab on deck, or cracks in excess of 3 mm in width may be cause for rejection of slab or portion of slab at the Architect's discretion.
- .2 Protect edges of cracks in slabs-on-grade from breakage.
- .3 Exposed ground floor slab: Unless slab is rejected, repair cracks that are over 0.4 mm wide:
- .4 Fill cracks with a sand-cement grout after concrete is at least 120 days old.
- .5 Seven days later, cut out top 20 mm of crack for a width of 5 mm and fill with control joint filler.

END OF SECTION

1 GENERAL

1.1 RELATED WORK

- .1 Concrete Reinforcement Section 03 20 00
- .2 Cast-in-Place Concrete Section 03 30 00
- .3 Sealants Section 07 92 00

1.2 REFERENCE STANDARDS

- .1 Do concrete floor finishing work in accordance with CSA-A23.1-19 except where specified otherwise.

2 PRODUCTS

2.1 MATERIALS

- .1 Concrete materials to Section 03 30 00 - Cast-in-Place Concrete; and reinforcement to Section 03 20 00 - Concrete Reinforcement.
- .2 Absorptive mat or fabric for curing, Terrafix or approved equivalent.
- .3 Curing and sealing compound: to ASTM C309 Type 1 Class B, clear.

2.2 Sealing Compounds

- .1 Surface sealer: to CAN/CGSB-25.20, Type 2 - water based, clear.
- .2 Surface sealers may not be manufactured or formulated with aromatic solvents formaldehyde halogenated solvents mercury lead cadmium hexavalent chromium and their compounds.
- .3 VOC limit for sealers = 100 g/l as per 01 35 21.

2.3 Curing Compounds

- .1 Select water-based, organic-solvent free curing compounds, VOC compliant as per Section 01 35 21 = 100 g/l.

3 EXECUTION

3.1 FLOOR FINISH

- .1 Floor slab surfaces shall be finished to Class A classification as defined in CSA-A23.1-19, Table 22 or flatter if required by the architect or flooring contractor. General Contractor and Finishing Contractor are to coordinate requirements with suppliers. If finish is not done to the satisfaction of the architect, engineer or flooring contractor, repairs including but not limited to patching, levelling, grinding or replacement may be directed, at the cost of the finishing contractor.
- .2 Do not sprinkle dry cement or dry cement and sand mixture over concrete surfaces.
- .3 Saw cut crack-control joints to CSA-A23.1-19 and fill with EUCO QWICKJOINT UVR or Sika Loadflex..
- .4 Apply floor curing and sealing compounds to manufacturer's instructions. Cure to

manufacturer's recommendations.

- .5 Cure concrete in accordance with CSA-A23.1-19 except where specified otherwise.
- .6 Provide any housekeeping pads for electrical and mechanical equipment. Coordinate size and location of all pads with mechanical & electrical engineering drawings as well as supplier drawings & requirements, which ever is greater. Refer to structural drawings for housekeeping pad details.
- .7 Slope floor to drain at 5mm/m. except as indicated otherwise. Floors to be level around walls.
- .8 Provide non-slip light broom finish to exposed interior steps and landings. Provide non-slip medium broom finish to exposed exterior steps, ramps, and landings.
- .9 Ground floor slab on grade to be cured using an absorptive mat or fabric kept continuously wet for min. 4 days.
- .10 Where special finish is indicated on Architectural documents take care to prepare surface in accordance with application / burnishing method.
- .11 Where indicated in room finish schedule, apply Liqui-Hard concrete densifier and chemical hardener by W.R. Meadows in strict accordance with manufacturer's application requirements.

3.2 PROTECTION

- .1 Protect concrete to be left exposed throughout the course of construction. Make good damaged areas to the approval of the Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1	Section 03 30 00	Cast-In-Place Concrete
.2	Section 04 05 12	Masonry Mortar and Grout
.3	Section 04 05 19	Masonry Anchorage and Reinforcing
.4	Section 04 05 23	Masonry Accessories
.5	Section 04 21 13	Brick Masonry
.6	Section 04 22 00	Concrete Unit Masonry
.7	Section 05 50 00	Metal Fabrications
.8	Section 07 92 00	Joint Sealants
.9	Section 08 11 16	Metal Doors and Frames

1.2 REFERENCES

- .1 ASTM International ASTM A 496/A 496M-07, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
- .2 Do masonry work in accordance with CSA A371-94 except where specified otherwise. Maintain a copy of this standard on job site during masonry work.
- .3 CSA International
 - .1 CAN/CSA-A82-06, Fired Masonry Brick Made From Clay or Shale.
 - .2 CAN/CSA-A165 SERIES-04(R2009), CSA Standards on Concrete Masonry Units covers: A165.1, A165.2, A165.3.
 - .3 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
 - .4 CAN/CSA-A370-04(R2009), Connectors for Masonry.
 - .5 CAN/CSA A371-04(R2009), Masonry Construction for Buildings.
 - .6 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .7 CSA S304.1-04(R2009), Design of Masonry Structures.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards, SCAQMD Rule 1113-A2007, Architectural Coatings.

1.3 SOURCE QUALITY CONTROL

- .1 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
- .2 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards, include data indicating initial rate of absorption for units proposed for use.

1.4 SAMPLES

- .1 Submit samples in accordance with the following:
 - .1 Two (2) of each type of masonry unit specified
 - .2 One (1) of each type of masonry accessory specified
 - .3 One (1) of each type of masonry reinforcement and tie proposed for use
 - .4 Other items required for testing purposes

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to job site in dry condition.
- .2 Keep materials dry until use, except where wetting of bricks is specified.
- .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 COLD WEATHER REQUIREMENTS

- .1 When air temperature is below 5 degrees C take following precautions in preparing and using mortar:
 - .1 Heat sand slowly and evenly. Do not use scorched sand, having a reddish cast, in mortar
 - .2 Heat water to 70 degrees C maximum
 - .3 After combining heated ingredients maintain temperature of mortar between 5 degrees C and 50 degrees C until used
 - .4 Protect mortar from rain and snow
- .2 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in cold weather
- .3 When air temperature is below -4 degrees C protect and heat masonry to maintain air temperature above 0 degrees C on both sides of walls
- .4 When air temperature is below -4 degrees C, erect windbreaks to prevent differential freezing of walls

1.7 HOT WEATHER REQUIREMENTS

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

1.8 PROTECTION

- .1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Masonry materials are specified in related Sections indicated in 1.1 Related Requirements.

PART 3- EXECUTION

3.1 WORKMANSHIP

- .1 Build masonry plumb, level, and true to line, with vertical joints in alignment
- .2 Lay out coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting
- .3 Full head joints shall be attained by buttering both ends of each unit. Slushing of head joints after the unit is in place is not permitted

3.2 TOLERANCES

- .1 Deviation in joint thickness: +/- 3 mm (1/8")
- .2 Walls to receive thinset ceramic tile: plumb within 1:600.

3.3 EXPOSED MASONRY

- .1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.

3.4 JOINTING

- .1 Allow joints to set just enough to remove excess water, then tool with a round stainless-steel jointer to provide smooth, compressed, uniformly concave joints.
- .2 Strike flush all joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.

3.5 JOINING OF WORK

- .1 Where necessary to temporarily stop horizontal runs of masonry and in building corners:
 - .1 Step back masonry diagonally to lowest course previously laid
 - .2 Do not "tooth" new masonry
 - .3 Fill in adjacent courses before heights of stepped masonry reach 1200 mm (4'-0")

3.6 CUTTING

- .1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects
- .2 Make cuts straight, clean, and free from uneven edges

3.7 BUILDING-IN

- .1 Build in items required to be built into masonry
- .2 Prevent displacement of built-in items during construction. Check plumb, location, and alignment frequently, as work progresses
- .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar

3.8 WETTING OF BRICK

- .1 Except in cold weather, wet clay bricks having an initial rate of absorption exceeding one g/min/1000 mm²: wet to uniform degree of saturation, three (3) to twenty-four (24) hours before laying, and do not lay until surface is dry.
- .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

3.9 SUPPORT OF LOADS

- .1 Use 20 MPa concrete to Section 03 30 00: Cast-in-Place Concrete, where concrete fill is used in lieu of solid units
- .2 Use grout to CSA A179-M94 where grout is used in lieu of solid units
- .3 Install metal lath strips below voids to be filled with grout; keep strips 25 mm, 1" back from faces of units.

3.10 PROVISION FOR MOVEMENT

- .1 Leave 20 mm space between top of non-load bearing walls and partitions and structural steel elements, including but not limited to steel deck. Do not use wedges
- .2 Reinforce and grout solid cores on each side of control joint in concrete masonry.

3.11 LOOSE STEEL LINTELS

- .1 Provide and install loose steel lintels on all exterior openings. Centre over opening width. Provide minimum bearing of 150 mm on each side, unless noted otherwise. Provide minimum L75x75x10mm unless noted otherwise. All exterior steel lintels to be hot dip galvanized.

3.12 FILLING CORES

- .1 Place and grout reinforcing in accordance with CSA A371-94 and as indicated
- .2 Grout all block cores which are reinforced.
- .3 Grout parapet walls solid down to top of structural deck
- .4 Grout block cores solid for two courses below bearing points of structural and stair members, and as indicated on drawings.

3.13 OPENINGS

- .1 At all openings form, brace, and set lintel blocks for concrete block lintels. Provide min. 200 mm bearing. Install reinforcing and concrete as per structural drawings or if not shown, use two 15 M bars for lintels up to 1.2 m wide. Use 400 mm deep lintel and four 15 M bars for lintels up to 2.4 m wide
- .2 At all openings in block masonry walls exceeding 600 mm in depth, fill core at each side and for 600 mm past the top and bottom of opening with grout and reinforce with reinforcing as specified for wall. Similarly treat openings over 1.2 m in depth but extend grout and reinforcement the full storey height.

3.14 CONTROL JOINTS

- .1 Provide continuous vertical shrinkage control joints in block masonry walls at locations indicated or at max. 9 m o.c. in approved locations and between masonry walls supported on slab on grade and walls supported on structural foundation. Rake out 8 mm, ready for caulking. Use "Chicago" joint.
- .2 Provide continuous vertical control joints in brickwork at locations indicated or at max. 15 m o.c. at max. 5.7 m from wall corners, in approved locations.
- .3 Stop horizontal masonry reinforcing 25 mm from each side of control joints
- .4 Bond beam reinforcing to be continuous across control joints. Provide half block and vertical joint across bond beam
- .5 Keep control joints free of mortar. Caulk joint. Provide backer rod.

3.15 CAVITY WALLS

- .1 Provide purpose made grey plastic weep hole vents. Provide above shelf angles, beams, dampproof courses and flashings and at bottom of cavities. Locate at max. 600 mm o.c
- .2 Place 10 mm dia. plastic vent tubes in exterior joints at top of cavities. Provide at 400 mm o.c. Slope to drain out at 1:4
- .3 Keep cavity free of mortar and mortar droppings. Place wood strip on ties or reinforcement to catch all mortar droppings. Remove as work progresses. Back slope mortar beds at cavities just sufficient to minimize mortar projection into cavity.
- .4 Omit every third brick of the first course until masonry work is completed. Clean the cavity of the mortar droppings then replace the omitted brick.
- .5 Provide continuous metal cavity air stops to details shown on drawings, secure at maximum 600 mm o.c., through a continuous bead of sealant.

3.16 TESTING

- .1 Inspection and testing will be carried out by Testing Laboratory designated by the Owner
- .2 Owner will pay costs for testing.

END OF SECTION

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA A179-04, Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA A371-04, Masonry Construction for Buildings.
 - .4 CAN/CSA-A3000-03, Cementitious Materials Compendium; CAN/CSA-A3002-03, Masonry and Mortar Cement.
- .2 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.
 - .3 Provide Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS) in accordance with Section 01 35 29 - Health and Safety Requirements. Indicate VOC's mortar, grout, parging, colour additives and admixtures. Expressed as grams per litre (g/L).
- .2 Samples: Provide samples of mortar and coloured mortar.
- .3 Manufacturer's Instructions: Provide manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports including sand gradation tests in accordance with CAN/CSA A179 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.
- .4 Mock-ups: Construct mock-ups in accordance with Section 01 45 00 - Quality Control supplemented as follows:
 - .1 Construct mock-up sample panel of pointing.
 - .2 Sample panel: 3000 mm x 3000 mm using proposed procedures, colours, texture, finish and workmanship.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handles masonry mortar and grout materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
 - .1 Deliver prepackaged, dry-blended mortar mix to project site in labelled plastic-lined bags each bearing name and address of manufacturer, production codes or batch numbers, and colour or formula numbers.
 - .2 Maintain mortar, grout and packaged materials clean, dry, and protected against dampness, freezing, traffic and contamination by foreign materials.

1.5 SITE CONDITIONS

- .1 Ambient Conditions: maintain materials and surrounding air temperature to:
 - .1 Minimum 5 degrees C prior to, during, and 48 hours after completion of masonry work.
 - .2 Maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.
- .2 Weather Requirements: CAN/CSA A371 - Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Cement:
 - .1 Portland Cement: to CAN/CSA-A3000.
 - .2 Masonry Cement: to CAN/CSA-A3002 and CAN/CSA A179.
 - .3 Mortar Cement: to CAN/CSA-A3002 and CAN/CSA A179.
 - .4 Packaged Dry Combined Materials for mortar: to CAN/CSA A179.
- .3 Aggregate: supplied by one supplier.
 - .1 Fine Aggregate: to CAN/CSA A179. Use aggregate passing 1.18 mm (1/16") sieve where 6 mm (1/4") thick joints are indicated.
 - .2 Coarse Aggregate: to CAN/CSA A179.
- .4 Water: clean and potable.
- .5 Lime: Quick Lime to CAN/CSA A179. Hydrated Lime to CAN/CSA A179.
- .6 Bonding Agent: epoxy type.
- .7 Polymer Latex: organic polymer latex admixture of butadiene-styrene type non-emulsifiable bonding admixture.
- .8 Dirt resistant additives: aluminum tristearate, calcium stearate or ammonium stearate.
- .9 Concrete: CSA A23.1, A23.2-2000. Fill bond beams and lintels with 20 MPa pea gravel concrete.
- .10 Grout: to CSA A179-94 (R1999) Table 3.
- .11 Dry-block II mortar admixture: water repellent, bond enhancing admixture by Grace Construction Products Tel: (414) 354-4400, equal or better as recommended by manufacturer of SMU units.

2.2 MORTAR MIXES

- .1 Mortar for exterior masonry above grade:
 - .1 Loadbearing: type S based on proportion specifications.
 - .2 Non-Loadbearing: S based on proportion specifications.
- .2 Mortar for interior masonry:
 - .1 Loadbearing: type S based on proportion specifications.
 - .2 Non-Loadbearing: N based on proportion specifications.
- .3 Mortar for Parapet walls, chimneys, unprotected walls: type S based on proportion specifications,

- 12 MPa full bed, CAN/CSA A179.
- .4 Mortar for special masonry unit (SMU) veneer: Dry-block II mortar admixture: water repellent, bond enhancing admixture as recommended by Manufacturer of SMU units. Contractor to submit shop drawings for this product.
 - .5 Pointing Mortar: CAN/CSA A179, Type S using property specification with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
 - .6 Stain Resistant Pointing Mortar: one part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate to 2 percent of Portland cement by weight.
 - .7 Mortar For Glass Block Masonry: CAN/CSA A179, Type S, using the property specification.
 - .8 Pointing Mortar For Glass Block Masonry: CAN/CSA A179, Type S, using the property specification.
 - .9 Parging mortar: type S to CAN/CSA A179.
 - .10 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: type M based on proportion specifications, CAN/CSA A179.
 - .11 Following applies regardless of mortar types and uses specified above:
 - .1 Mortar for calcium silicate brick and concrete brick: type O based on proportion specifications.
 - .2 Mortar for stonework: type N based on proportion specifications.
 - .3 Mortar for grouted reinforced masonry: type S based on proportion specifications.

2.3 MORTAR MIXING

- .1 Use pre-blended, pre-coloured mortar prepackaged under controlled factory conditions. Ingredients batching limitations to be within 1% accuracy.
- .2 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.
- .3 Maintain sand uniformly damp immediately before mixing process.
- .4 Add mortar colour and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.
- .5 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.
- .6 Do not add air entraining admixture to mortar mix.
- .7 Use a batch type mixer in accordance with CAN/CSA A179.
- .8 Pointing mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.
- .9 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
- .10 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at

temperatures under 5 degrees C.

2.4 GROUT MIXES

- .1 Bond Beams: grout mix 10 to 12.5 MPa strength at 28 days; mixed in accordance with CAN/CSA A179 fine grout.
- .2 Lintels: grout mix 10 to 12.5 MPa strength at 28 days mixed in accordance with CAN/CSA A179 fine grout.
- .3 Grout: Minimum compressive strength of 12.5 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA A179.

2.5 GROUT MIXING

- .1 Mix batched and delivered grout in accordance with CAN/CSA-A23.1 transit mixed.
- .2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179 fine grout.
- .3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- .4 Do not use calcium chloride or chloride based admixtures.

2.6 MIX TESTS

- .1 Testing Mortar Mix:
 - .1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for mortar based on proportion specification. Test prior to construction and during construction for:
 - .1 Compressive strength.
 - .2 Consistency.
 - .3 Mortar aggregate ratio.
 - .4 Sand/cement ratio.
 - .5 Water content and water/cement ratio.
 - .6 Air content.
 - .7 Splitting tensile strength.
- .2 Testing Grout Mix:
 - .1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for grout based on proportion specification. Test prior to construction and during construction for:
 - .1 Compressive strength.
 - .2 Sand/cement ratio.
 - .3 Water content and water/cement ratio.
 - .4 Slump.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Request inspection of spaces to be grouted.

3.2 PREPARATION

- .1 Apply bonding agent to existing concrete surfaces.
- .2 Plug clean-out holes with block masonry units. Brace masonry for wet grout pressure.

3.3 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.4 CONSTRUCTION

- .1 Do masonry mortar and grout work in accordance with CAN/CSA A179 except where specified otherwise.
- .2 Apply parging in uniform coating not less than total 25 mm thick.

3.5 MIXING

- .1 All pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes, Clean all mixing boards and mechanical mixing machine between batches.
- .2 Mortar must be weaker than the units it is binding.
- .3 Contractor to appoint one individual to mix mortar, for duration of project. In the event that this individual must be changed, mortar mixing must cease until the new individual is trained, and mortar mix is tested.

3.6 MORTAR PLACEMENT

- .1 Install mortar to manufacturer's instructions.
- .2 Install mortar to requirements of CAN/CSA A179.
- .3 Remove excess mortar from grout spaces.

3.7 GROUT PLACEMENT

- .1 Install grout in accordance with manufacturer's instructions.
- .2 Install grout in accordance with CAN/CSA A179.
- .3 Work grout into masonry cores and cavities to eliminate voids.

- .4 Do not install grout in lifts greater than 400 mm, without consolidating grout by rodding.
- .5 Do not displace reinforcement while placing grout.

3.8 FIELD QUALITY CONTROL

- .1 Test and evaluate mortar prior to construction and during construction in accordance with CAN/CSA A179.
- .2 Test and evaluate grout prior to construction and during construction to CAN/CSA A179; test in conjunction with masonry unit sections specified.

3.9 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Remove droppings and splashings using clean sponge and water.
- .3 Clean masonry with low pressure clean water and soft natural bristle brush.

3.10 PROTECTION OF COMPLETED WORK

- .1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 04 04 99 Masonry Procedures.
- .2 Section 04 05 12 Masonry Mortar and Grout.

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM A 36/A 36M-05, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A 82/A 82M-05a, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .3 ASTM A 167-99(R2004), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .4 ASTM A 307-04, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .5 ASTM A 580/A 580M-06, Standard Specification for Stainless Steel Wire.
 - .6 ASTM A 641/A 641M-03, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .7 ASTM-A666-03, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA A179-04, Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA A370-04, Connectors for Masonry.
 - .4 CAN/CSA A371-04, Masonry Construction for Buildings.
 - .5 CAN/CSA G30.18-M92(R2007), Billet-Steel Bars for Concrete Reinforcement.
 - .6 CSA-S304.1-04, Design of Masonry Structures.
 - .7 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheets illustrating products to be incorporated into project for specified products.
 - .2 Provide Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
 - .1 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures. Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.
 - .2 Clearly indicate bar size, spacing, location, quantities of reinforcement and mesh, with identifying code marks in order to permit correct placement without reference to structural drawings, to "Reinforcing Steel Manual of Standard Practice" by Reinforcing Steel

- Institute of Canada, First Canadian Edition 1992.
- .3 Detail placement of reinforcing where special conditions occur.
- .4 Show walls and beams in full elevation with duct and other openings, and mechanical and electrical conduits/piping indicated. Detail all reinforcing.
- .5 Design and detail lap lengths and reinforcing development lengths to CSA A23.3-94, unless otherwise specified on drawings.
- .6 Provide shop drawings detailing bar bending details, anchorage details lists and placing drawings.
- .7 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.

- .4 Samples: Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Manufacturer's Instructions: Provide manufacturer's installation instructions.

1.4 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.

1.5 FIELD MEASUREMENTS

- .1 Make field measurements necessary to ensure proper fit of members.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle masonry anchorage and reinforcing materials in accordance with Section 01 61 00 - Common Product Requirements. Deliver reinforcement and connectors, identified in shop and placement drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Bar reinforcement: Steel to CAN/CSA A371 and CAN/CSA G30.18.
- .2 Connectors: to CAN/CSA A370 and CSA-S304.1.
- .3 Corrosion protection: to CSA-S304.1, galvanized to CSA-S304.1 and CAN/CSA A370.
- .4 Fasteners: installed post-construction:
 - .1 Screw Shields and Plugs: nylon, vibration-resistant, chemical-resistant, water-resistant, install in mortar joints.
 - .2 Bolts and Screws: size and type to suit application, locate where indicated.
 - .3 Nails: case-hardened cut or spiral nails, size and type to suit fastening application.
 - .4 Powder-Driven Fasteners: pin styles and lengths to suit fastening application in accordance with manufacturers use, load and hold recommendations.
 - .5 Adhesives: epoxies, mastics and contact cements for fastening applications, use in accordance with manufacturers' recommendations.
- .5 Ties: hot dip galvanized to CAN/CSA A370 Table 5.2 steel finish.

- .6 Horizontal reinforcing: truss type, as manufactured by Blok-Lok. See Structural Drawings for sizes. Rod extension to suit the wall cavity. Provide complete with "U" shaped 4.76 mm dia. double adjustable tie.
- .7 Adjustable steel stud veneer anchors: Model # 10-18 as manufactured by Bailey Metal Products Ltd., sizes to suit studs.
- .8 Horizontal and vertical reinforcing: deformed bars conforming to CSA G30 Series, $F_y=58$ KSI (400 MPa).
- .9 Miscellaneous individual brick masonry veneer ties: hot dipped, galvanized, straps, slotted heavy-duty rap-ties as manufactured by Fero.
- .10 Epoxy adhesive system: Hilti HIT Adhesive Anchoring System to suit the application.

2.2 FABRICATION

- .1 Fabricate reinforcing in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Fabricate connectors in accordance with CAN/CSA A370.
- .3 Weld reinforcement in accordance with CSA W186.
- .4 Ship reinforcement and connectors clearly identified in accordance with drawings.

2.3 SOURCE QUALITY CONTROL

- .1 Provide certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis, minimum 3 weeks prior to commencing reinforcement work.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

- .1 Direct and coordinate placement of metal anchors for masonry supplied to other Sections.

3.3 INSTALLATION

- .1 Supply and install masonry connectors and reinforcement in accordance with CAN/CSA A370, CAN/CSA A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
- .2 Prior to placing concrete, mortar or grout, obtain Consultant's approval of placement of reinforcement and connectors.
- .3 Supply and install additional reinforcement to masonry as indicated.

3.4 BONDING AND TYING

- .1 Bond walls of two or more wythes using metal connectors in accordance with CSA-S304.1,

CAN/CSA A371 and as indicated.

- .2 Tie masonry veneer to backing in accordance with NBC, CSA-S304.1, CAN/CSA A371 and as indicated.
- .3 At locations of masonry veneer over steel stud walls, install adjustable veneer anchors type.
- .4 Install unit, adjustable, single wythe and multiple wythe joint reinforcement in accordance with CAN/CSA A370 and CAN/CSA A371 and manufacturer's instructions.
 - .1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA A371 and as indicated.
 - .2 Install horizontal joint reinforcement maximum 400 mm on centre.
 - .3 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.
 - .4 Place joint reinforcement continuous in first and second joint below top of walls.
 - .5 Lap joint reinforcement ends minimum 150 mm.
 - .6 Connect stack bonded unit and joint corners and intersections with strap anchors 400 mm on centre.

3.5 HORIZONTAL REINFORCING

- .1 In all interior non-loadbearing block walls, install truss type horizontal reinforcing at spacings and size indicated on the structural drawings. The width of trusses shall be 50 mm less than the width of blocks. For example, for a 150 mm

3.6 EARTHQUAKE REINFORCEMENT

- .1 Reinforce loadbearing masonry in accordance with OBC and as indicated on the drawings.
- .2 Reinforce the following masonry elements in accordance with CAN3-S304-M84 and as indicated on structural drawings and specifications:
 - .1 Loadbearing and lateral load-resisting masonry
 - .2 Masonry enclosing elevator shafts and stairways
 - .3 Masonry used as exterior cladding
 - .4 Masonry partitions

3.7 REINFORCED LINTELS AND BOND BEAMS

- .1 Reinforce masonry beams, masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA-S304.1, CAN/CSA A371, and CAN/CSA A179.
- .3 Support and position reinforcing bars in accordance with CAN/CSA A371.

3.8 GROUTING

- .1 Grout masonry in accordance with CSA-S304.1, CAN/CSA A371 and CAN/CSA A179 and as indicated.

3.9 ANCHORS

- .1 Supply and install metal anchors in accordance with CAN/CSA A370 and CAN/CSA A371 and as indicated.

3.10 LATERAL SUPPORT AND ANCHORAGE

- .1 Supply and install lateral support and anchorage in accordance with CSA-S304.1 and as indicated.

3.11 MOVEMENT JOINTS

- .1 Reinforcement will not be continuous across movement joints unless otherwise indicated.
- .2 Stop reinforcing 25 mm short of each side of control joints unless otherwise indicated.

3.12 FIELD BENDING

- .1 Do not field bend reinforcement and connectors except if authorized by Consultant.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars and connectors which develop cracks or splits.

3.13 FIELD QUALITY CONTROL

- .1 Site inspections.
- .2 Obtain Structural Engineer's approval of placement of reinforcement and connectors, prior to placing mortar and grout.

3.14 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.15 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning. Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 04 04 99 Masonry Procedures
- .2 Section 04 05 23 Masonry Accessories
- .3 Section 04 21 23 Brick Masonry
- .4 Section 07 62 00 Sheet Metal Flashing and Trim

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM D 2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA A371-04, Masonry Construction for Buildings.
 - .2 CAN/CSA-ISO 14021-00(R2204), Environmental Labels and Declarations - Self Declared Environmental Claims (Type II Environmental Labelling).
- .3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Provide manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures. Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario. Shop drawings consist of flashing and installation details. Indicate sizes, spacing, location and quantities of fasteners.
- .4 Samples: Provide masonry accessory samples in accordance with Section 01 33 00 - Submittal Procedures.

1.4 FIELD MEASUREMENTS

- .1 Make field measurements necessary to ensure proper fit of members.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle masonry accessories in accordance with, Section 01 61 00 - Common Product Requirements supplemented as follows:
 - .1 Keep fillers and adhesives dry, protected against dampness, and freezing.
 - .2 Store packaged materials off ground and in accordance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Movement joint filler: purpose-made elastomer, outsized 30% to 50%, 20 durometer hardness to ASTM D 2240 of size and shape indicated. Use low VOC products in compliance with the SCAQMD Rule 1168.
- .2 Lap adhesive: recommended by masonry flashing manufacturer. Use low VOC products in compliance with the SCAQMD Rule 1168.
- .3 Mechanical fasteners: recommended by flashing manufacturer to suit project requirements.
- .4 Fire Stop Material: "Fire Stop" as manufactured by AA/D Distributors.

PART 3- EXECUTION

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION: MATERIALS

- .1 Install continuous movement joint fillers in movement joints at locations indicated on drawings.
- .2 Lap adhesive: apply adhesive to flashing lap joints.
- .3 Mechanical fasteners: install fasteners to suit application and in accordance with manufacturer's written installation instructions.

3.3 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning. Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- | | | |
|----|------------------|-----------------------------------|
| .1 | Section 04 05 12 | Masonry Mortar and Grout |
| .2 | Section 04 05 19 | Masonry Anchorage and Reinforcing |
| .3 | Section 04 05 23 | Masonry Accessories |
| .4 | Section 04 22 00 | Concrete Unit Masonry |

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM C 73-05, Standard Specification for Calcium Silicate Brick (Sand-Lime Brick).
 - .2 ASTM C 216-07a, Standard Specification for, Facing Brick (Solid Masonry Units Made of Clay or Shale).
- .2 Brick Industry Association (BIA): Technical Note No. 20-2006, Cleaning Brick Work.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA A82-06, Fired Masonry Brick Made From Clay or Shale).
 - .2 CAN/CSA-A165 Series-2004, CSA Standards on Concrete Masonry Units.
 - .3 CAN/CSA A371-04, Masonry Construction for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Provide manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Manufacturer's Instructions: Provide manufacturer's installation instructions.
- .4 Samples: Provide unit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.4 SITE CONDITIONS

- .1 Ambient Conditions: assemble and erect components only when temperature is above 4 degrees C.

PART 2 - PRODUCTS

2.1 FACE BRICK

- .1 Fired clay brick: shall conform to CAN/CSA A82.1-M87
 - .1 Type: FBX Grade SW
 - .2 Compressive strength: 16 MPA minimum
 - .3 Size: metric modular brick (57 x 190 x 90mm) and special shapes as required
 - .4 Colour and texture: shall match approved sample in Architect's office
 - .5 Acceptable material: Architectural Brick Series by Brampton Brick or Hanson Brick or equivalent.
 - .6 Brick colour and texture: To match existing bricks.

PART 3- EXECUTION

3.1 EXAMINATION

- .1 Verify surfaces and conditions are ready to accept work of this Section.
- .2 Commencing installation means acceptance of existing substrates.

3.2 PREPARATION

- .1 Protect adjacent finished materials from damage due to masonry work.

3.3 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.4 INSTALLATION

- .1 Construction to conform to CAN/CSA A371.
- .2 Bond: running stretcher or as indicated on drawings.
- .3 Coursing height: 200 mm for three (3) bricks and three (3) joints.
- .4 Jointing: concave where exposed or where paint or similar thin finish coating is specified.
- .5 Mixing and blending: mix units within each pallet and with other pallets to ensure uniform blend of colour and texture. Remove black flashed units.
- .6 Carry up all walls in a uniform manner without any one wall raised more than 1200 mm above another at one time.
- .7 Except where noted otherwise, set masonry units in running bond and tooth bond all intersections of walls and partitions. Lay masonry with voids and webs aligned with the block below.
- .8 Where brick and SMU work are to be exposed, courses shall be level, and alternate vertical joints shall be aligned. Joints shall be slightly tooled concave. Use stainless steel jointing tools.
- .9 The maximum joint thickness shall be 10 mm. Where the specified horizontal reinforcing will cause the joint thickness to exceed 10 mm cut the webs of the masonry unit to accommodate the reinforcing and to achieve a maximum joint thickness of 10 mm.
- .10 Machine cut with a carborundum saw all exposed masonry units which are adjusted in size.
- .11 Where shown on the drawings or called for in the Specifications, build-in reglets to receive flashings. Leave reglet free of mortar, caulk.
- .12 Cut and make good all openings or chases required by other trades. Where conduits or pipes occur in masonry work, take special care to ensure that final finish of masonry is presentable; secure the cooperation of other trades to ensure this result.
- .13 Provide steel angle lintels at all openings in 90 mm masonry veneers unless shown otherwise on the drawings. Minimum L 75x75x10mm (200mm beyond each jamb).
- .14 Provide temporary bracing of walls during and after erection until permanent lateral support is in place.

- .15 Clean unglazed clay masonry as work progresses. Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

3.5 MORTAR COLOURS

- .1 Up to two (2) different mortar colours will be selected by the Architect at a later date
- .2 Mortar colour will be similar to the adjacent brick and/or match existing.

3.6 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .3 Pressure wash to the satisfaction of the Consultant.

3.7 DAMAGE DURING INSTALLATION

- .1 Do not install defective units. Replace any units damaged by contractor at contractor's expense. All damaged units not reported as damaged upon inspection at time of delivery are presumed to have been damaged by contractor or improper job site handling. Do not allow units to be mishandled. Keep cap cover on all units until installed. Contractor, at his expense, shall remove any scratches, tar or dirt caused by mishandling.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- | | | |
|----|------------------|-----------------------------------|
| .1 | Section 04 05 12 | Masonry Mortar and Grout |
| .2 | Section 04 05 19 | Masonry Anchorage and Reinforcing |
| .3 | Section 04 05 23 | Masonry Accessories |

1.2 REFERENCES

- .1 ASTM International Inc.: ASTM E 336-07, Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A165 Series-2004, CSA Standards on Concrete Masonry Units covers: A165.1, A165.2, A165.3.
 - .2 CAN/CSA A371-04, Masonry Construction for Buildings.
 - .3 CSA S304.1-04, Design of Masonry Structures.
- .3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD): SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .4 Underwriters' Laboratories of Canada (ULC): CAN/ULC-S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: provide product data, including manufacturer's printed data sheets and catalog pages illustrating products to be incorporated into project for specified products.
- .3 Provide Manufacturer's Written Instructions.
- .4 Submit shop drawings for structural masonry in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups and in accordance with CAN-A23.4-00 and CAN-A23.1/A23.2-00. Each drawing submitted shall bear stamp and signature of qualified professional engineer registered in the Province of Ontario. Indicate the following:
 - .1 Formwork
 - .2 Design calculations for items designated by manufacturer
 - .3 Tables and bending diagrams of reinforcing steel
 - .4 Methods of handling and placing
 - .5 Relationship to adjacent material
 - .6 Methods of lifting and erection
 - .7 Openings, sleeves, inserts and related reinforcement, joint and connection details.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Standard cellular masonry units shall conform to CAN/CSA-A165 Series (CAN/CSA-A165.1)

- .1 Classification: H/15/A/M for standard weight, hollow units, 8.3 MPa
- .2 Size: metric modular
- .3 Special Shapes: Provide purpose made shapes for lintels, bond beams, corners and 190 mm long units. Provide bullnose units for all vertical and horizontal corners. Use solid concrete masonry units at interior window sills and top course of partial height walls. Use solid concrete masonry units at top course of partial height walls. All corner units shall have 190 mm return
- .4 Use Shouldice 424 Rock Sill, Sloped away from the wall, Tex Stone Face for exterior window sills

2.2 TOLERANCES

- .1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA A165.1, supplemented as follows:
 - .1 Maximum variation between units within specific job lot not to exceed 2 mm.
 - .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
 - .3 Out of square tolerance not to exceed 2 mm.
- .2 Tolerances for architectural concrete masonry units in accordance with CAN/CSA A165.1, supplemented as follows:
 - .1 Maximum variation in length or height between units within specific job lot for specified dimension not to exceed 2 mm.
 - .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
 - .3 Out of square tolerance not to exceed 2 mm.
 - .4 Maximum variation in width between units within specific job lot for specified dimension not to exceed 2mm.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verify surfaces and conditions are ready to accept work of this Section.
- .2 Commencing installation means acceptance of existing substrates.

3.2 PREPARATION

- .1 Protect adjacent finished materials from damage due to masonry work.

3.3 INSTALLATION

- .1 Bond: running, except where indicated otherwise
- .2 Jointing: concave
- .3 Coursing height: 200 mm for one (1) block and one (1) joint
- .4 Carry up all walls in a uniform manner without any one wall raised more than 1200 mm above another at one time.
- .5 Except where noted otherwise, set masonry units in running bond and tooth bond all intersections of walls and partitions. Lay blocks with voids and webs aligned with the block below. See

drawings for special patterns.

- .6 Where brick and block work are to be exposed, courses shall be level, and alternate vertical joints shall be aligned. Joints shall be slightly tooled concave. Use stainless steel jointing tools.
- .7 Chipped blocks shall not be used where block work, either painted or unpainted, is to be exposed.
- .8 The maximum joint thickness shall be 10 mm. Where the specified horizontal reinforcing will cause the joint thickness to exceed 10 mm cut the webs of the blocks to accommodate the reinforcing and to achieve a maximum joint thickness of 10 mm.
- .9 Machine cut with a carborundum saw all exposed masonry units which are adjusted in size.
- .10 Carry all walls and partitions up to the underside of construction above and finish against underside of roof deck or floor slab above (in accordance with details shown on the drawings). Pack all voids between top of walls or partitions and metal deck with firestopping material.
- .11 Where shown on the drawings or called for in the Specifications, build-in reglets to receive flashings. Leave reglet free of mortar.
- .12 Cut and make good all openings or chases required by other trades. Where conduits or pipes occur in masonry work, take special care to ensure that final finish of masonry is presentable; secure the cooperation of other trades to ensure this result.
- .13 Where mechanical or electrical work occurs in walls, the walls shall be thickened to suit and to maintain required fire, smoke, and sound separations. Refer to mechanical and electrical drawings. Do not form horizontal chases.
- .14 Build-in sleeves as required.
- .15 As required, all conduits, etc., provided and erected by other trades, shall be built-in without breaking bond.
- .16 Close masonry walls tightly around all penetrations which occur through them in ceiling spaces. Build in around fire dampers in accordance with the requirements of the Underwriters' Laboratory of Canada.
- .17 At all openings in masonry walls completely fill hollow units with concrete at the jambs and reinforce vertically.
- .18 Provide lintel blocks with steel reinforcing at all openings in masonry walls unless shown otherwise on the drawings.
- .19 Provide steel angle lintels at all openings in 90 mm masonry veneers unless shown otherwise on the drawings.
- .20 Build-in steel door frames and fill frames with mortar as walls are brought up.
- .21 As required, break out block cores in order to install horizontal and vertical reinforcing as specified.
- .22 Set bearing plates for joists, beams, etc., at locations and elevations indicated on the structural drawings.
- .23 Provide temporary bracing of walls during and after erection until permanent lateral support is in place.

3.4 REINFORCEMENT

- .1 Install reinforcing in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .2 Install horizontal and vertical reinforcing as indicated on the structural drawings.
- .3 Construct reinforced concrete block wall panels one (1) storey high before placing reinforcement and grouting.
- .4 Provide clean-out ports as required for "high-lift grouting".
- .5 Do not grout reinforced cores until clean-out port and reinforcing have been reviewed by Engineer.

3.5 CONCRETE MASONRY LINTELS

- .1 As called for on the drawings, concrete masonry lintels shall be installed in the openings. Fill all lintels and bond beams with 20 MPA 3000 psi concrete. As indicated on Structural Drawings, provide bearing for all lintels.

3.6 CONSTRUCTION

- .1 Cull out masonry units, in accordance with CAN/CSA A165 and approved range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.
- .2 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.
- .3 Construct masonry walls using running bond unless otherwise noted.
- .4 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.
- .5 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.
- .6 Install movement joints and keep free of mortar where indicated.
- .7 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.
- .8 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.
- .9 Ensure compacted head joints. Use full or face-shell joint as indicated.
- .10 Tamp units firmly into place.
- .11 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.
- .12 Tool exposed joints concave; strike concealed joints flush.
- .13 After mortar has achieved initial set up, tool joints.
- .14 Do not interrupt bond below or above openings.

3.7 REPAIR/RESTORATION

- .1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

3.8 PROTECTION

- .1 Brace and protect concrete unit masonry.

END OF SECTION

1 GENERAL

1.1 RELATED WORK

- | | | |
|----|------------------------|------------------|
| .1 | Concrete Reinforcement | Section 03 20 00 |
| .2 | Cast-in-Place Concrete | Section 03 30 00 |
| .3 | Steel Joists | Section 03 21 00 |
| .4 | Steel Decking | Section 03 31 00 |
| .5 | Painting | Section 09 91 00 |

1.2 REFERENCE STANDARDS

- .1 Do structural steel work in accordance with CAN/CSA-S16-19 and CAN3-S136-19 except where specified otherwise.
- .2 Do welding in accordance with CSA W59-24 by companies certified by and welders qualified in accordance with CSA W47.1-19 (R2024), except where specified otherwise.
- .3 Welding of reinforcing bars to be done in accordance with W186.

1.3 SOURCE QUALITY CONTROL

- .1 Prior to commencing of work, if required by Engineer, submit 3 certified copies of mill reports covering chemical and physical properties of steel used in this work.

1.4 DESIGN OF DETAILS

- .1 Design details and connections in accordance with requirements of and Connections CSA-S16-19 and CSA-S136-19.
- .2 For all connections, submit sketches and design calculations stamped and signed by qualified professional engineer licensed in the Province of Ontario or submit shop drawings stamped and signed by a qualified professional engineer licensed in the Province of Ontario with the proviso "for connections only".
- .3 Contractor & steel detailer are to review all architectural assemblies. Connections are to be detailed so as to not interfere with architectural assemblies or fire rated enclosures. At brace frames gussets & stiffeners are not to interfere with or project beyond assemblies.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 30 00.
- .2 Indicate shop and erection details including cuts, copes, connections, holes, bolts and welds. Indicate welds by welding symbols defined in CSA W59-24.
- .3 Sealed shop drawings are to include all temporary bracing requirements as well as erection plans and procedures. All temporary works and erection plans/ sequencing are to be reviewed and coordinated with the general contractor and other structural trades to ensure there are no overlapping interference during erection. Submit plans to structural consultant for review prior to steel erection.

1.6 COORDINATION WITH OTHER TRADES

- .1 Work must be carried out in a coordinated fashion with other trades including but not limited to
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formwork, concrete finishing, reinforcing ,masonry, mechanical trades & fire protection contractor Materials and elements must be coordinated for interference and timing to ensure they are provided to site in a timely manor so as to not hold up site activities.

- .2 Contractor is to review Architectural, Mechanical Engineer, M&E Contractor drawings for all floor & roof penetrations or openings. Coordinate sizes and exact locations of penetrations/ openings, and provide framing as per structural typical details. If location or size conflicts are noted, steel contractor is to coordinate with M&E Engineer and Contractor for resolution.

1.7 QUALITY ASSURANCE

- .1 Provide the consultant with a copy of fabrication shop certification, along with qualification of welders and welding supervisors prior to fabricating any steel.

2 PRODUCTS

2.1 MATERIALS

- .1 Structural steel: to CAN3-G40.21-13 (R2023) Grade as indicated on structural drawings.
- .2 Anchor bolts: to CAN3-G40.21-13 (R2023), Grade A307.
- .3 Bolts, nuts and washers: to ASTM A325M.
- .4 Welding materials: to CSA W59-24.
- .5 Shop paint primer: to CISC/CPMA standard 1-73a.
- .6 Hot Dip Galvanizing: Galvanize steel, where indicated, to CSA G164-M92, minimum zinc coating of 600 g/m2. Repair areas damaged during construction.
- .7 Reinforcing Steel: to CSA G30.18-21

3 EXECUTION

3.1 FABRICATION

- .1 Fabricate structural steel, as indicated, in accordance with CAN/CSA-S16-19 and in accordance with approved shop drawings.
- .2 Use weldable grade reinforcing as required for anchors where indicated on structural drawings. For welding of reinforcing steel contractor to have CWB approved procedures and is to be done in conformance with CSA W186.

3.2 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CSA-S16-19 except where members are to be encased in concrete or more refined preparation is required for intumescent coatings.
- .2 Apply primer paint to exposed surfaces without sags or runs. Sand down and repaint areas not acceptable to the Architect.
- .3 Coordinate work with fire protection contractor to ensure that primer and fire protection material are compatible.
- .4 Do not prime the webs of member deeper than 410 mm.

3.3 MARKING

- .1 Mark materials in accordance with CAN3-G40.20-13(R2023) and CAN/CSA-G40.21-13(R2023). Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark for fit and match.

3.4 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16-19 and in accordance with shop drawings.
- .2 All anchor bolts are to be templated, provide steel template for all anchor bolts. Coordinate with formwork and reinforcing contractors to accurately locate and template anchor bolts to be cast in.
- .3 Obtain written permission of Engineer prior to field cutting or altering of structural members not shown on shop drawings.
- .4 Clean mechanical brush and touch up primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .5 Steel erector is to provide a safe erection procedure, sealed by a P.Eng licensed in the province of Ontario, showing all relevant information to construct the structure in accordance with CSA S16-19, CL 4.3.4 and provided to the consultant team for review. All temporary bracing for stability, including building lateral stability and slenderness of elements until final design condition is achieved. Temporary construction loading accounting for all erection and installation loads, including storage allowance of materials above ground is to be indicated. Removal of any temporary bracing is to be at the discretion of the contractor's engineer, and a sealed letter is to be provided confirming the structure is adequately stable prior to removal of any bracing.
- .6 All temporary bracing is to be coordinated with other trades and the general contractor to ensure no other site activities, or other bracing are impacted.
- .7 Provide sealed remedial details, as required, to address or correct any site issues with structural steel identified by the consultant or 3rd party steel inspector.

3.5 FIELD QUALITY CONTROL

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Owner.
- .2 Costs of tests will be paid for as specified in Section 01 45 00 Quality Control.
- .3 All 3rd party steel inspections are to be carried out on site by a minimum level 1 CSA W178.2 certified inspector and supervised by a minimum level 2 CSA W178.2 certified inspector.

3.6 HOT DIP GALVANIZING

- .1 Hot dip galvanize all steel lintels and steel exposed to environment.

3.7 FINAL SIGN OFF

- .1 Contractor is to provide final as built drawings to the consultant.
- .2 Contractor is to provide a final sign off letter, sealed by the design engineer, confirming the structure and connections were installed in general conformance with the drawings.

END OF SECTION

1 GENERAL

1.1 RELATED WORK

- .1 Structural Steel Section 05 12 00
- .2 Steel Decking Section 05 30 00
- .3 Painting Section 09 91 00

1.2 REFERENCE STANDARDS

- .1 Do work in accordance with CSA-S16-19, CAN/CSA-S136-19, except where specified otherwise.
- .2 Do welding in accordance with CSA W59-18(R2023) except where specified otherwise.
- .3 Use qualified fabricators in accordance with CSA W47.1-19 and "CISC Steel Joist Facts".

1.3 DESIGN OF STEEL JOISTS AND BRIDGING

- .1 Design steel joists panel point welded connections and bridging to carry loads indicated on drawings in accordance with CAN/CSA- S16-19 CAN/CSA-S136-19
- .2 Live load deflections not to exceed L/400 (Floor), L/360 (Roof) and 25 mm (max).
- .1 Gymnasium joists are to be designed to a maximum deflection of L/360 (45mm max), except at curtain or folding partitions. Curtain maximum deflection including live loads + snow loads noted on drawings is to be limited to 32mm, and folding partitions to 19mm maximum.
- .3 Total load deflection not to exceed L/240
- .4 Review architectural drawings for use of floor area and design for appropriate loading zone as per design loads shown on structural plans. Coordinate location of all non-load bearing partitions for OWSJ design.
- .5 Coordinate with fire protection contractor for minimum member sizes and fireproofing thickness. The structure has not been designed using any load restrictions. Refer to Design and Detailing Criteria on General Note page for additional requirements.
- .6 Review mechanical drawings and coordinate with mechanical contractor for any ductwork in joist spaces and weight of piping 6" diameter and larger. Bridging is to be coordinated to avoid interference.
 - .1 Box bridging as required to allow mechanical ductwork to pass within joist spaces. Review mechanical drawings and coordinate locations.
- .7 Bridging shown on structural drawings is to be considered a minimum. Provide final bridging to suite joist stability and uplift loading. All bridging is to be erected in a neat and coordinated manner.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 30 00.
- .2 Each drawing submitted shall bear the signature and stamp of qualified professional engineer licensed in Province of Ontario.
- .3 Indicate joist spacing, bridging lines, bearing and anchorage details, framed openings, accessories, schedule of materials, depth, camber and loadings.

1.5 COORDINATION WITH OTHER TRADES

- .1 Work must be carried out in a coordinated fashion with other trades including but not limited to formwork, concrete finishing, reinforcing, masonry, mechanical trades & fire protection contractor. Materials and elements must be coordinated for interference and timing to ensure they are provided to site in a timely manner so as to not hold up site activities.
- .2 Contractor is to review Architectural, Mechanical Engineer, M&E Contractor drawings for all floor & roof penetrations or openings as well as duct and plumbing runs. Coordinate sizes and exact locations of penetrations/ openings. Adjust typical joist location up to 100mm to avoid interference, provided joist location is not a tie joist, or otherwise providing bracing for elements. If joists are proposed to be relocated, review with and obtain approval from engineer of record. Provide details to box bridging around mechanical ductwork to allow to pass within joist spaces as applicable. If location or size conflicts are noted, steel contractor is to coordinate with M&E Engineer and Contractor for resolution.

1.6 QUALITY ASSURANCE

- .1 Provide the consultant with a copy of fabrication shop certification, along with qualification of welders and welding supervisors prior to fabricating any steel.

2 PRODUCTS

2.1 MATERIALS

- .1 Structural steel: to CAN/CSA-G40.21-13(R2023) and CAN/CSA-S136-19
- .2 Welding materials: to CSA W59 with CSA W59.1.
- .3 Shop paint primer: to CISC/CPMA standard 1.73a.

2.2 FABRICATION

- .1 Fabricate steel joists and accessories in accordance with CSA-S16-19 and CAN/CSA-S136-19 and in accordance with reviewed shop drawings.
- .2 Weld in accordance with CSA W59-24

2.3 SHOP PAINTING

- .1 Clean, prepare surface and shop prime steel to CSA-S16-19.
- .2 Apply primer paint to exposed surfaces without sags or runs. Sand down and repaint areas not acceptable to the Architect.
- .3 Coordinate work with fire protection contractor to ensure that primer and fire protection material are compatible.

3 EXECUTION

3.1 ERECTION

- .1 Erect steel joists and bridging as indicated in accordance with CSA-S16-19 and CAN/CSA-S136-19 and in accordance with shop drawings.
- .2 Obtain written permission from Engineer prior to field cutting or altering joists or bridging.

- .3 Clean and touch up shop primer to bolts, welds, burned or scratched surfaces at completion of erection.

3.2 Field Quality Control

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Owner.
- .2 Costs of tests will be paid for as specified in Section 01 45 00 Quality Control.

END OF SECTION

1 GENERAL

1.1 RELATED WORK

- .1 Structural Steel Section 05 12 00
- .2 Cast-In-Place Concrete Section 03 30 00
- .3 Steel Joists Section 05 21 00

1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A653/A653M-08, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M-08, Specification for Steel Sheet, 55% Aluminium-Zinc Alloy-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA C22.2 No.79-16(R2021), Cellular Metal and Cellular Concrete Floor Raceways and Fittings.
 - .2 CAN/CSA-S16-19 Design of Steel Structures.
 - .3 CSA-S136-19, Cold Formed Steel Structural Members.
 - .4 CSA W47.1-19 (R2024), Certification of Companies for Fusion Welding of Steel Structures.
 - .5 CSA W55.3-08(R2023), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .6 CSA W59-24, Welded Steel Construction, (Metal Arc Welding) Metric.
- .4 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI 10M-2018, Standard for Steel Roof Deck.

2 PRODUCTS

2.1 MATERIALS

- .1 Zinc (Z) coated steel sheet: to ASTM A653/A653M structural quality Grade A with Z275, coating, 0.91 mm minimum base steel thickness.
- .2 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.91 mm. Metallic coating same as deck material.
- .3 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.2 TYPES OF DECKING

- .1 Typical Roof Deck: 0.91 mm minimum base steel thickness, 38mm deep profile, fluted, @152 o/c, non-cellular, overlapping side laps. Unless noted on plans
- .2 Refer to deck designation and fastening patterns on structural drawings.

3 EXECUTION

3.1 GENERAL

- .1 Structural steel work: in accordance with CAN/CSA-S136-19 and CSSBI 10M and CSSBI 12M.
- .2 Welding: in accordance with CSA W59-24 except where specified otherwise.
- .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1-19 (R2024) for fusion welding of steel and/or CSA W55.3-08 (R2023) for resistance welding.

3.2 ERECTION

- .1 Erect metal decking as indicated to manufacturer's instructions.
- .2 Immediately after decking is permanently secured in place touch-up galvanized surface with zinc rich primer where burned by welding.
- .3 Fastening requirements shall be as noted on structural drawings.
- .4 The decking shall be continuous over at least 3 spans with ends lapped 50mm minimum over supports.

3.3 STORAGE

- .1 Decking shall be stored on wood supports above the grade and sloped so as to allow runoff along down flutes.

3.4 ACCESSORIES

- .1 Provide all required closures, reinforcing sheet steel and flashing.

3.5 OPENINGS AND AREAS OF CONCENTRATED LOADS

- .1 Framing of deck openings 100 to 300 mm shall be as recommended by manufacturer except as otherwise indicated on structural drawings. No reinforcement required for openings cut in deck, which are smaller than 100 mm where minimum distance between unreinforced openings is 1200 mm transverse and one span longitudinally.
- .2 Contractor is to review all Architectural, Mechanical Engineer and M&E Contractor drawings to locate and size all openings. Provide framing for openings as per structural typical details. Contractor is to coordinate openings to avoid interference.

3.6 FIELD QUALITY CONTROL

- .1 Inspection and testing of material and workmanship will be carried out by testing laboratory.
- .2 Quality assurance shall be in conformance with Section 01 45 00.
- .3 Damaged decking shall be replaced at Consultants discretion.

3.7 REVIEW OF CONSTRUCTION

- .1 Review of construction by the Consultant and inspection and testing by an independent inspection is to ascertain general conformity with design documents. The review does not relieve contractor from carrying out his own quality control and making the work accurate and in conformity with the drawings and specification.
- .2 Exercise care when welding to avoid piercing the deck or damage to the supporting joists. Any damage to supporting structure is to be reported to Consultant.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM A 53/A 53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 CSA International
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16-09, Design of Steel Structures.
 - .4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties. Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Shop drawings shall bear the stamp of an independent qualified professional structural engineer, registered in the Province of Ontario. Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Deliver materials to site in original factory packaging.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.5 DESIGN CRITERIA

- .1 Provide structural design for all work listed in item .2 below
- .2 Detail and fabricate work in accordance with Section 4 of The Ontario Building Code:
 - .1 Lintels and shelf angles.
 - .2 Access ladders
 - .3 Tubular HSS steel supports for pressed steel frames and screens.
 - .4 Lateral support nonloadbearing masonry walls.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A 53/A 53M
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A 307.
- .6 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m2 to CAN/CSA G164-M92 (R1998).
- .7 Shop Coat Primer for Interior Steel: to CAN/CGSB-1.40-97
- .8 Zinc Primer: Zinc rich, ready mix to CAN/CGSB-1-181-99.
- .9 Shop Coat Primer for Exterior Exposed Steel: Organic zinc rich epoxy primer: two component polyamide epoxy zinc-rich coating. Acceptable Material: Sherwin Williams Zinc Clad IV, B69A8/B69V8.
- .10 Grout: non-shrink, non-metallic, flowable, 24 h, MPa 15, pull out strength 7.9 MPa.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.4 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items. Except where hot dip galvanizing is specified, clean to SSPC SP-10 near-white blast cleaning and prime paint exterior steel items after fabrication, apply organic zinc-rich epoxy primer.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

2.5 ANGLE LINTELS

- .1 Steel angles: galvanized, sizes indicated for openings. Provide 150 mm minimum bearing at ends. Provide steel angles above all openings in masonry veneer. Minimum angle to be L 75x75x10mm.
- .2 Weld or bolt back-to-back angles to profiles as indicated.
- .3 Hot dip galvanized for exterior applications and prime painted for interior work.

2.6 LATERAL SUPPORT, NON-LOAD BEARING MASONRY WALLS

- .1 Provide masonry lateral support brackets on both sides at the top of all non-load bearing masonry walls.
- .2 Also, provide for anchoring to the underside of steel beams, structural supports and steel joists.
- .3 Prime paint after fabrication.

2.7 BRACKET SUPPORTS FOR WALL COUNTERS

- .1 For installation to concrete or concrete block: fabricate bracket supports from 50.8 mm x 50.8 mm x 3.81 mm steel tubing to shape and size indicated. Close off ends.
- .2 For installation at drywall partitions: fabricate from 50.8 mm x 50.8 mm x 3.81 mm steel tubing to shape and size indicated welded to 76.2 mm x 76.2 mm x 6.35 mm posts complete with baseplates for anchoring into concrete slab.
- .3 Prime paint after fabrication.
- .4 Powder coat all exposed bracket support.

PART 3- EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .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 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16 or Weld field connection.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.3 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 CSA Group (CSA)
 - .1 CSA A123.22-08 (R2013) - Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - .2 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples. Galvanized for exterior work, highly humid interior areas and for treated lumber; plain finish elsewhere. Use spiral thread nails
 - .3 CSA G164 (latest revision), Galvanizing
 - .4 CSA O141-05 (R2014), Softwood Lumber.
 - .5 CSA O151-09 (R2014), Canadian Softwood Plywood.
 - .6 CAN/CSA-80 Series.
 - .7 CSA Series O80-15, Wood Preservation.
 - .8 CSA-0121, exterior grade fir plywood of thickness indicated good one side. Use veneer core with type I bond.
 - .9 CAN3-O437 Series-93, Standards on OSB and Waferboard.
 - .10 CAN/CSA-O325.0-92(R1988), Construction Sheathing.
- .3 American National Standards Institute/National Particleboard Association (ANSI/NPA): ANSI/NPA A208.1-2009, Particleboard.
- .4 Underwriters' Laboratories of Canada (ULC): CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.
- .5 Dimension lumber to: CSA 0141 (latest revision) specified group to CSA 086(latest revision) as listed in the National Lumber Grades Authority Standard Grading Rules (latest revision) – grade category as follows;
 - .1 Light Framing: Spruce or Pine Construction Grade, u/n otherwise
 - .2 Structural Light Framing: Spruce No.2 grade or better
- .6 Fasteners: to hollow masonry use toggle bolts; to solid masonry or concrete use Hilti-Hit masonry fasteners; to steel use bolts or power activated fasteners. Use inorganic fibre plugs where screws are specified into concrete or masonry.
- .7 Bolts: 12mm diameter unless indicated otherwise (complete with nuts and washers). Refer to structural drawings.
- .8 Pressure Treated Wood: to CAN/CSA-080-1- (latest revision); treat dimension lumber to CAN/CSA-080.2-M89 using pentachlorophenol or copper naphthenate preservative to obtain a minimum retention of 6.4 kg/m³ of wood; treat plywood to CAN/CSA-808.9- (latest revision) using pentachlorophenol or copper naphthenate preservative to obtain a minimum retention of 4.8 kg/m³ of wood; use type 'A' hydrocarbon solvents to CSA 080.201- (latest revision).
- .9 The Truss Plate Institute of Canada: Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses 2007.

1.2 QUALITY ASSURANCE

- .1 Ontario Building Code (OBC) – current edition.
- .2 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .3 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.3 MOCK-UPS

- .1 Provide a 600mm mock-up of wood blocking system, including closures for each detail or profile for review in a location designated by the Consultant in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Review mock-up to ensure design intent can be achieved. Verify all intersecting and adjoining elevations to ensure that continuity of roofing and closures can be achieved. Verify attachment, methods for securing and pullout strengths to ensure that work can support the anticipated loads and will remain in place against all wind, weather and service conditions without warping or deforming.

1.4 PRECAUTIONS

- .1 Provide temporary protection, to the satisfaction of the Consultant, to render all wood blocking watertight, if for any reason permanent membrane protection cannot be provided within the same day. Ensure the base of any curbs are temporarily sealed to prevent water from entering below the curb assembly, or behind sheathing, should the roof assembly not be completed on the same day as the carpentry work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 FRAMING STRUCTURAL AND PANEL MATERIALS

- .1 Lumber: softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
 - .1 CSA O141 – latest revision and CAN3-086 latest revision.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Framing and board lumber: in accordance with OBC – current edition
- .3 Glulam in accordance with Structural Glued-Laminated Timber CAN/CSA-O122.

- .4 Wood I-joists in accordance with Prefabricated Wood I-Joists ASTM D 5055.
- .5 Light-frame trusses in accordance with "Truss Design and Procedures for Light Metal Connected Wood Trusses", The Truss Plate Institute of Canada.
- .6 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 S2S or S4S material
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade
 - .4 Post and timbers sizes: "Standard" or better grade
- .7 Wood curbs, plywood strips at roof parapets: fire retardant treated wood in accordance with CSA 080-1- (latest revision).
- .8 Structural Composite Lumber (SCL) in accordance with ASTM D 5456.
- .9 Plywood, OSB and wood based composite panels: to CSA O325.
- .10 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .11 Canadian softwood plywood (CSP): to CSA O151, standard construction.

2.2 WOOD PRESERVATIVE

- .1 Rough carpentry shall include lumber treated to CSA O80.
- .2 For treating on site, maximum allowable VOC limit 350 g/L.
- .3 Surface-applied wood preservative: Coloured or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

2.3 PANEL MATERIALS

- .1 Canadian softwood plywood (CSP): To CSA O151, urea-formaldehyde free.
- .2 Fire-retardant-treated wood and plywood: to CAN/CSA-80 Series, impregnated with fire-retardant chemicals in solution under high pressure.

2.4 FASTENERS

- .1 Wood to wood fasteners: Wood screw #12 or as indicated, galvanized flat head, of sufficient length to completely penetrate through base minimum 25 mm.
- .2 Wood to steel deck fasteners: Screws to be factory coated with an additional corrosion protection.
 - .1 Standard of acceptance:
 - .1 Climaseal, or accepted alternate.
- .3 Plywood to concrete, brick or hollow masonry fasteners: 6 mm diameter screws. Length to provide minimum 32 mm and maximum 40 mm embedment into substrate as required. Type to be approved subject to results of pull tests.
 - .1 Standard of acceptance:
 - .1 Tapcon, or accepted alternate.

- .4 Expansion fasteners for wood plates and steel to concrete deck: AISI Type 304 stainless steel, with stainless nuts and washers.
 - .1 Standard of acceptance:
 - .1 Hilti Kwik Bolt TZ, or accepted alternate.
- .5 Adhesive anchors: Size noted on the drawings or size recommended by manufacturer. Coordinate selection of fastener with manufacturer of item to be secured and obtain structural engineers approval and written consent before proceeding.
 - .1 Standard of acceptance:
 - .1 HIT HY150 by HILTI, or accepted alternate.
- .6 Exposed fasteners for metal to wood or masonry: Use #10 cadmium plated hex screws with neoprene and steel washers. Minimum length 38 mm. Use lead shields, as required for anchoring. Colour of screw head to meet approval of Consultant.
 - .1 Standard of acceptance:
 - .1 Atlas Bolt, Rawl, or accepted alternate.
- .7 Nails, spikes and staples: To CSA B111.

2.5 ACCESSORIES

- .1 Semi-rigid insulation to Section 07 21 16 – Blanket Insulation.
- .2 Metal closure: 0.56 mm (26 ga.) galvanized steel unless otherwise shown or specified.
- .3 Self-adhered membrane: To CSA A123.22, self-adhering membrane consisting of SBS rubberized asphalt compound laminated to a polyethylene film. Minimum thickness 1 mm.
 - .1 Standard of acceptance:
 - .1 Lastobond Shield HT by Soprema.
 - .2 PE200HT by Henry.
 - .3 AquaBarrier™ AVB by IKO.
 - .4 Or accepted alternate.
- .4 Spray-in-place foam insulation in accordance with Section 07 21 29.03 – Sprayed Insulation – Polyurethane Foam.

2.6 FINISHES

- .1 Galvanizing: To ASTM A653/A653M, use galvanized fasteners for all work.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate. Inform Consultant of unacceptable conditions immediately upon discovery.
- .2 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.

- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material as follows:
 - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
 - .2 Wood furring on outside surface of exterior masonry and concrete walls.
 - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.3 INSTALLATION

- .1 Comply with requirements of Ontario Building Code OBC (latest edition), Part 9.
- .2 Install members true to line, levels and elevations, square and plumb.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install spanning members with "crown-edge" up.
- .5 Install subflooring and combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm. In addition to mechanical fasteners, floor panels secure floor subflooring to floor joists using glue and screws. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.
- .6 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, electrical equipment mounting boards, and other work as required.
- .7 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing. Align and plumb faces of furring and blocking to tolerance of 1:600.
- .8 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .9 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.
- .10 Backpaint all wood in contact with masonry, precast, and cured concrete. Apply pressure treated wood preservative to all wood in contact with ground, mortar, concrete (not completely cured), or any other surface with potential to come in contact with moisture.
- .11 Provide backerboard for mounting electrical equipment. Use 19mm plywood on 19x38mm furring around perimeter and at maximum 300mm intermediate spacing.
- .12 Install sleepers as indicated.
- .13 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .14 Countersink bolts where necessary to provide clearance for other work.
- .15 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

- .16 Bevel leading edge of wood panel products on vertical applications to facilitate membrane installation and as detailed on drawings
- .17 Erect to CSA 086- (latest revision).

3.4 ROOFING GENERAL INSTALLATION

- .1 Extend air/vapour barrier seals up vertical surfaces and curbs and onto the deck as shown on the Drawings, to provide continuity.
- .2 Slope the top of all wood blocking at the roof perimeter in towards the roof at a minimum of 5%, unless otherwise shown on the Drawings.
- .3 Comply with requirements of NBC, supplemented by the following paragraphs.
- .4 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .5 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .6 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .7 Install wood, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .8 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .9 Install sleepers as indicated. Install level with weight distributed evenly on 25 mm Type 4 extruded polystyrene insulation or other support base as indicated.
- .10 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.5 ROOFING SECUREMENT OF WOOD BLOCKING

- .1 Comply with more stringent requirements as required by drawings or Ontario Building Code requirements. Increase number and spacing of all fasteners by 50% for 2400 mm from all outside roof corners.
- .2 Install fasteners to the design intent to hold all wood blocking permanently in place to prevent warping, deflection and to resist all wind and weather conditions.
- .3 Secure wood to concrete in a staggered pattern with each row spaced at minimum 600 mm c/c with specified fasteners. Drill holes 13 mm deeper than depth of fastener penetration.
- .4 Secure wood to metal deck in a staggered pattern with each row spaced at 450 mm c/c with specified fasteners at minimum 450 mm c/c. Secure bottom nailer with

minimum two rows of No. 10, galvanized steel screws at maximum spacing of 600 mm. Screws shall be of sufficient length to penetrate top flute of decking a minimum 13 mm and a maximum of 19 mm.

- .5 Install fasteners in two rows in the direction of the grain, offset one to another in a staggered fashion by approximately 50%. All fasteners shall be placed minimum 10 mm from any edge of framing.
- .6 Unless specified otherwise, the number of fasteners shall be doubled at all outside parapet corners, for a distance of 3 m from the corner.
- .7 For any exposed fastening, provide touch-up paint as required to coat all exposed surfaces of screws damaged during the driving process.

3.6 ROOFING SHEATING INSTALLATION

- .1 Plywood:
 - .1 Not less than 2 mm gaps shall be provided between sheets, to allow for material expansion.
 - .2 Unless otherwise indicated, fasten plywood with a minimum of thirty-six fasteners per 1200 mm x 2400 mm sheet.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 07 21 16 – Blanket Insulation.
- .2 Section 07 21 29.03 – Sprayed Insulation – Polyurethane Foam.
- .3 Section 07 52 00 – Modified Bituminous Membrane Roofing.
- .4 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .5 Section 07 92 00 – Joint Sealants.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 CSA Group (CSA)
 - .1 CSA A123.22-08 (R2013) - Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - .2 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .3 CSA O141-05 (R2014), Softwood Lumber.
 - .4 CSA O151-09 (R2014), Canadian Softwood Plywood.
 - .5 CAN/CSA-80 Series.
 - .6 CSA Series O80-15, Wood Preservation.
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702-14, Standard for Mineral Fibre Thermal Insulation for Buildings.
 - .3 CAN/ULC-S702.2-10, Standard for Mineral Fibre Thermal Insulation for Buildings, Part 2: Application.
 - .4 CAN/ULC-S705.1-01, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
 - .5 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.3 QUALITY ASSURANCE

- .1 Lumber identification: By grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: By grade mark in accordance with applicable CSA Standards.

1.4 MOCK-UPS

- .1 Provide a 600 mm mock-up of wood blocking system, including closures for each detail or profile for review in a location designated by the Consultant in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Review mock-up to ensure design intent can be achieved. Verify all intersecting and adjoining elevations to ensure that continuity of roofing and closures can be achieved. Verify attachment, methods for securing and pullout strengths to ensure that work can support the anticipated loads and will remain in place against all wind, weather and service conditions without warping or deforming.

1.5 PRECAUTIONS

- .1 Provide temporary protection, to the satisfaction of the Consultant, to render all wood blocking watertight, if for any reason permanent membrane protection cannot be provided within the same day. Ensure the base of any curbs are temporarily sealed to prevent water from entering below the curb assembly, or behind sheathing, should the roof assembly not be completed on the same day as the carpentry work.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and acceptance requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and handling requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 STRUCTURAL FRAMING

- .1 Lumber: Unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with CSA O141 and NLGA Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing and sleepers, S2S is acceptable for all surfaces.
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.

2.2 WOOD PRESERVATIVE

- .1 Rough carpentry shall include lumber treated to CSA O80.
- .2 For treating on site, maximum allowable VOC limit 350 g/L.
- .3 Surface-applied wood preservative: Coloured or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

2.3 PANEL MATERIALS

- .1 Canadian softwood plywood (CSP): To CSA O151, urea-formaldehyde free.
- .2 Fire-retardant-treated wood and plywood: to CAN/CSA-80 Series, impregnated with fire-retardant chemicals in solution under high pressure.

2.4 FASTENERS

- .1 Wood to wood fasteners: Wood screw #12 or as indicated, galvanized flat head, of sufficient length to completely penetrate through base minimum 25 mm.
- .2 Wood to steel deck fasteners: Screws to be factory coated with an additional corrosion protection.
 - .1 Standard of acceptance:
 - .1 Climaseal, or accepted alternate.
- .3 Plywood to concrete, brick or hollow masonry fasteners: 6 mm diameter screws. Length to provide minimum 32 mm and maximum 40 mm embedment into substrate as required. Type to be approved subject to results of pull tests.
 - .1 Standard of acceptance:
 - .1 Tapcon, or accepted alternate.
- .4 Expansion fasteners for wood plates and steel to concrete deck: AISI Type 304 stainless steel, with stainless nuts and washers.
 - .1 Standard of acceptance:
 - .1 Hilti Kwik Bolt TZ, or accepted alternate.

- .5 Adhesive anchors: Size noted on the drawings or size recommended by manufacturer. Co-ordinate selection of fastener with manufacturer of item to be secured and obtain structural engineers approval and written consent before proceeding.
 - .1 Standard of acceptance:
 - .1 HIT HY150 by HILTI, or accepted alternate.
- .6 Exposed fasteners for metal to wood or masonry: Use #10 cadmium plated hex screws with neoprene and steel washers. Minimum length 38 mm. Use lead shields, as required for anchoring. Colour of screw head to meet approval of Consultant.
 - .1 Standard of acceptance:
 - .1 Atlas Bolt, Rawl, or accepted alternate.
- .7 Nails, spikes and staples: To CSA B111.

2.5 ACCESSORIES

- .1 Semi-rigid insulation to Section 07 21 16 – Blanket Insulation.
- .2 Metal closure: 0.56 mm (26 ga.) galvanized steel unless otherwise shown or specified.
- .3 Self-adhered membrane: To CSA A123.22, self-adhering membrane consisting of SBS rubberized asphalt compound laminated to a polyethylene film. Minimum thickness 1 mm.
 - .1 Standard of acceptance:
 - .1 Lastobond Shield HT by Soprema.
 - .2 PE200HT by Henry.
 - .3 AquaBarrier™ AVB by IKO.
 - .4 Or accepted alternate.
- .4 Spray-in-place foam insulation in accordance with Section 07 21 29.03 – Sprayed Insulation – Polyurethane Foam.

2.6 FINISHES

- .1 Galvanizing: To ASTM A653/A653M, use galvanized fasteners for all work.

Part 3 Execution

3.1 GENERAL INSTALLATION

- .1 Extend air/vapour barrier seals up vertical surfaces and curbs and onto the deck as shown on the Drawings, to provide continuity.
- .2 Slope the top of all wood blocking at the roof perimeter in towards the roof at a minimum of 5%, unless otherwise shown on the Drawings.

- .3 Comply with requirements of NBC, supplemented by the following paragraphs.
- .4 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .5 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .6 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .7 Install wood, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .8 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .9 Install sleepers as indicated. Install level with weight distributed evenly on 25 mm Type 4 extruded polystyrene insulation or other support base as indicated.
- .10 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.2 SECUREMENT OF WOOD BLOCKING

- .1 Comply with more stringent requirements as required by drawings or Ontario Building Code requirements. Increase number and spacing of all fasteners by 50% for 2400 mm from all outside roof corners.
- .2 Install fasteners to the design intent to hold all wood blocking permanently in place to prevent warping, deflection and to resist all wind and weather conditions.
- .3 Secure wood to concrete in a staggered pattern with each row spaced at minimum 600 mm c/c with specified fasteners. Drill holes 13 mm deeper than depth of fastener penetration.
- .4 Secure wood to metal deck in a staggered pattern with each row spaced at 450 mm c/c with specified fasteners at minimum 450 mm c/c. Secure bottom nailer with minimum two rows of No. 10, galvanized steel screws at maximum spacing of 600 mm. Screws shall be of sufficient length to penetrate top flute of decking a minimum 13 mm and a maximum of 19 mm.
- .5 Install fasteners in two rows in the direction of the grain, offset one to another in a staggered fashion by approximately 50%. All fasteners shall be placed minimum 10 mm from any edge of framing.
- .6 Unless specified otherwise, the number of fasteners shall be doubled at all outside parapet corners, for a distance of 3 m from the corner.
- .7 For any exposed fastening, provide touch-up paint as required to coat all exposed surfaces of screws damaged during the driving process.

3.3 SHEATHING INSTALLATION

- .1 Plywood:
 - .1 Not less than 2 mm gaps shall be provided between sheets, to allow for material expansion.
 - .2 Unless otherwise indicated, fasten plywood with a minimum of thirty-six fasteners per 1200 mm x 2400 mm sheet.

3.4 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.
- .3 Bevel leading edge of wood panel products on vertical applications to facilitate membrane installation and as detailed on drawings.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Unless otherwise shown on the drawings, or called for in this specification, all millwork construction shall comply with Architectural Woodwork Manufacturers Association of Canada - Latest Edition, Custom Grade Standards for Flush Overlay Casework, Part 300.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI): Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 (2009).
- .3 Canadian General Standards Board (CGSB): CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .4 CSA International
 - .1 CSA B111-74(R2003)], Wire Nails, Spikes and Staples.
 - .2 CSA O112.10-08, Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).
 - .3 CSA O115-M1982 (R2001) hardwood and Decorative Plywood
 - .4 CSA O121-08, Douglas Fir Plywood.
 - .5 CSA O141-05(R2009), Softwood Lumber.
 - .6 CSA O151-09, Canadian Softwood Plywood.
 - .7 CSA O153-M1980(R2008), Poplar Plywood.
- .5 National Hardwood Lumber Association (NHLA): Rules for the Measurement and Inspection of Hardwood and Cypress 2011.

1.2 FACTORY FINISHING

- .1 All "exposed" and "semi-exposed" surfaces of millwork shall be prefinished at the Contractor's plant prior to shipping to the job site. Touch up on site as required after installation is completed. Finishing shall be carried out in conformance with Part 600, "Factory Finishing" of the AWMAC Quality Standards for Architectural Woodwork, 1998.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Before any millwork work is fabricated, submit to the Architect, for review, shop drawings fully illustrating the millwork.

1.4 EXAMINATION AND COORDINATION

- .1 Examine all the drawings and specifications to determine the extent of the work.
- .2 Coordinate with other trades for incorporation of mechanical, electrical, or other items into millwork.

1.5 MOISTURE CONTENT

- .1 Ensure that moisture content for millwork does not exceed 6%

1.6 QUALITY ASSURANCE

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Protect millwork against dampness and damage during and after delivery.
 - .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance in clean, dry, well-ventilated area.
 - .2 Store and protect architectural woodwork from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Softwood lumber: to CSA 0141-1970 and National Lumber Grades Authority requirements, with maximum moisture content of 6% for interior work, yard lumber select for paint finish pine species, to AWMAC custom grade.
- .2 Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements, moisture content of maximum 6% for interior work, oak or maple species, (confirm with owner if maple or oak to be used), to AWMAC custom grade.
- .3 Plywood:
 - .1 HARDWOOD VENEER CORE PLYWOOD: CSA 0115-M1982, Type II, select architectural grade, rotary cut veneer, "uniform light".
 - .2 DOUGLAS FIR PLYWOOD: CSA 0121-M1978, Veneer Core, Type 1
 - .3 Plywood shall comply with the following:
 - .1 G2S for doors and panels exposed to view on both sides
 - .2 G1S for members exposed to view on one (1) side
 - .3 S2S for items not exposed to view
- .4 GLUES: CSA 0112.5-M1977
- .5 PRESERVATIVE: CSA 080-M1983
- .6 POST FORMED COUNTERTOPS: To match Bélanger profile 2300.
- .7 SOLID LUMBER;
 - .1 Rough Carpentry - of any appropriate species shall conform to CSA 0141 and NLGA requirements. Construction or Appearance grade lumber or yard lumber selected for paint finish. Millwork exposed - Maple, conforming to AWMAC custom grade standards.

- .8 MAPLE (for all hardwood and hardwood edging):
 - .1 Maple: 38 mm thick, hard "select white" natural, free of defects at exposed faces.
- .9 Nails and staples: to CSA B111.
- .10 Wood screws: stainless steel, type and size to suit application.
- .11 Splines: wood.
- .12 Sealant: clear silicone.

2.2 FABRICATION

- .1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.
- .9 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .10 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .11 Apply laminate backing sheet to reverse side of core of plastic laminate work.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for architectural woodwork installation in accordance with manufacturer's instructions.
 - .1 Visually inspect substrate. Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied.

3.2 HARDWARE INSTALLATION

- .1 Supply and install all finish hardware listed in Section 08 70 05 Cabinet and Miscellaneous Hardware.

3.3 INSTALLATION

- .1 Do architectural woodwork to Quality Standards of AWMAC.
- .2 Supply and install built-in and unit cabinetwork as shown on drawings.
- .3 Mortise, dowel, block, and glue all joints.
- .4 Ensure that the work is finished solid, square, and level with all drawers and doors operating properly.
- .5 Wood for cabinetwork shall be without defects in any exposed parts.
- .6 Prior to manufacture of cabinetwork, determine from the millwork hardware section items specified for use by this trade. Supply and installation of hardware shall be by the millwork manufacturer.
- .7 Select veneer to provide bookmatch.
- .8 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .9 Fasten and anchor millwork securely. Supply and install heavy duty fixture attachments for wall mounted cabinets.
- .10 Use draw bolts in countertop joints.
- .11 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .12 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant in accordance with Section 07 92 00 - Joint Sealants.
- .13 Apply bituminous coating over wood framing members in contact with masonry or cementitious construction.
- .14 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

3.4 PREPARATION

- .1 Provide all rough hardware required for the proper execution of the work and provide and use all requisite screws, nails, bolts, holdfasts, and accessories not otherwise specified.
- .2 Backpaint all woodwork in contact with masonry, precast, and cured concrete. Apply preservative to all wood in contact with the ground, mortar, and concrete not completely dry and cured.
- .3 Where required, provide and set rough wood bucks to openings. These shall be anchored to the walls with approved type metal anchors.
- .4 Provide blocking in existing stud spaces as required for installation of all items, including (but not limited to): Sinks, vanities, countertops, washroom accessories, benches, shelves, millwork and equipment. Reinstate affected surfaces to seamless appearance using CGC VHI Board, thickness as required to suit. Where existing surfaces are affected, prepare and repaint entire surface to match existing in accordance with M.P.I. printed best practices.

- .5 Carefully plug the walls where necessary for securing other work where metal plugs have not been provided by other trades, and provide all necessary nailing strips or blocks required.

3.5 GENERAL MILLWORK WORKMANSHIP

- .1 Millwork shall be preassembled in the shop as far as practicable and delivered to the building ready to be set in place. Finished items shall be carefully worked to details, sanded free of surface defects and machine marks. Conceal nails and screws and include blocking and gluing, all as commensurate with first class durable work. Trim shall be cleanly cut with all mitres accurately made and fitted.
- .2 All hardwood and hardwood veneer to have concealed fastenings where possible. Otherwise recess screws and bolts and plug holes with minimum 6mm thick wood plugs (species, colour, grain and grain orientation to match hardwood). Sand plugged areas smooth to receive finish. Where finishing nails are used, inset nails at regular intervals in straight lines for neat and even appearance. Apply filler (colour to match wood) and sand smooth ready to receive finish.
- .3 Frames and finish of every sort shall not be set until moisture contributing finishes are dry and relative humidity in the building approximates normal conditions. Work shall be fitted and scribed to other finished work in a careful manner with all necessary precautions taken to avoid defacing adjacent surfaces.
- .4 A hardwood edge shall be glued and nailed to exposed edges of plywood.
- .5 Members shall be erected in pieces as long as possible with inconspicuous joints.
- .6 SITE DIMENSIONS AND CONDITIONS shall be the responsibility of the Contractor and no extra will be allowed for material which does not fit the required conditions.
- .7 All nails shall be long enough so that at least half their length penetrates the second member. Avoid splitting of wood by staggering the nails in the direction of the grain and keep nails as far away from edges as possible.

3.6 PROTECTION

- .1 Protect millwork and cabinet work from damage until final inspection.
- .2 Protect installed products and components from damage during construction.
- .3 Repair damage to adjacent materials caused by architectural woodwork installation.

END OF SECTION

PART 1- GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit duplicate samples of joints, edging and cutouts in accordance with Section 01 33 00 - Submittal Procedures.

1.2 MAINTENANCE DATA

- .1 Provide maintenance data for plastic laminate work for incorporation into Operation and Maintenance Manual specified in Section 01 78 00.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Cover finished laminated plastic surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.
 - .3 Do not store or install materials in areas where relative humidity is less than 25% or greater than 60% at 22 degrees C.
 - .4 Shop assemble work for delivery to site in size easily handled and to assure passage through building openings.
 - .5 Store and protect laminate, adhesive, and core materials from nicks, scratches, and blemishes.
 - .6 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Laminated plastic for flatwork: to CAN3-A172-M79, Grade GP-R, 1.27 mm thick; based on solid or printed pattern colour range by Wilsonart and Arborite with suede finish.
- .2 Laminated plastic for postforming work: to CAN3-A172, Grade PF, 1.27 mm thick, based on printed pattern, full colour range by Wilsonart with matte finish.
- .3 Laminated plastic colours:
PL-1 – Raw Cotton 4947-38
PL-2 – Norwegian Ash 8241
- .4 Plywood core: to CSA 0151 solid two sides, 19 mm thick.
- .5 Laminated plastic liner sheet: supplied by same manufacturer as facing sheet, not less than 0.76 mm thick, white colour.
- .6 Laminated plastic adhesive: urea resin adhesive to CSA 0112.5-M1977

- .7 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.
- .8 Sealant: in accordance with Section 07 92 00, colour shall be selected later by Architect.

2.2 FABRICATION

- .1 Comply with NEMA LD3, Annex A.
- .2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .3 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .4 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.
- .5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .6 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .7 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .8 Apply laminated plastic liner sheet to interior of cabinetry.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for laminate, adhesive, and core materials installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Install work plumb, true and square, neatly scribed to adjoining surfaces.
- .2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- .3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75 mm from edge. Make flush hairline joints.
- .4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
- .5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.

END OF SECTION

PART 1- GENERAL

1.1 Related Documents

- .1 Drawings and general provisions of the Contract, including General Conditions and Division 1.

1.2 Summary of Work

- .1 Work Included: The work of this Section includes the provision of all labour, materials, equipment and services required to supply and install board insulation, as indicated on the drawings, as specified herein and as required for a complete project.

- .2 Related Work:

- .1 Section 03 30 00 - Cast-in-Place Concrete.
- .2 Section 31 23 10 - Excavating, Trenching and Backfilling.

1.3 Reference Standards

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM E84-10a, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .2 Underwriters' Laboratories of Canada (ULC):
 - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene Boards and Pipe Covering.

1.4 Delivery, Storage & Handling

- .1 Deliver products in original unopened packaging with legible manufacturer's identification.
- .2 Store materials in strict accordance with the manufacturer's recommendations.

1.5 Submittals

- .1 Provide product information as per section 01 33 00 submittal procedure.

1.6 Extent of Work

- .1 At locations as per drawings:
 - .1 Install 50mm board insulation under new asphalt/concrete as shown on drawings.
 - .1 Below Grade: Extruded polystyrene board to CAN/ULC-S701, Type IV, square ends, shiplap edges except where otherwise indicated, thickness as indicated. Minimum RSI 0.87 m².oC/W per 25.4 mm thickness, compressive strength 210 kPa. Standard of Acceptance: Styrofoam SM.
 - .2 Under Slab on Grade: Extruded polystyrene board to CAN/ULC-S701, Type IV, square ends, shiplap edges except where otherwise indicated, thickness as indicated. Minimum RSI 0.87nm².oC/W per 25.4 mm thickness, compressive strength 275 kPa. Standard of Acceptance: Styrofoam High Load-40.

PART 2- PRODUCTS

2.1 Insulation

Below Grade, Insulation shall be Styrofoam SM, extruded polystyrene insulation board as manufactured by Dow Chemical of Canada or the equivalent as manufactured by Esso Building Products of Canada or as manufactured by Owens Corning. Board size and extent shall be as indicated on Architectural Drawings.

Under Slab on Grade, Insulation shall be Styrofoam Highload 40, extruded polystyrene insulation board as manufactured by Dow Chemical of Canada or the equivalent as manufactured by Esso Building Products of Canada or as manufactured by Owens Corning. Board size and extent shall be as indicated on Architectural Drawings.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 Workmanship

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .5 Offset both vertical and horizontal joints in multiple layer applications.
- .6 In addition to adhesive, install insulation boards with insulation clips and disk, 6 per 600 x 1200 mm board minimum, fit boards tight, cut off fastener spindle 3 mm beyond disk.
- .7 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide blue skin strip over expansion and control joints using compatible adhesive before application of insulation.
- .8 Coordinate with the excavating, trenching and backfilling contractor to ensure suitable preparation of the subgrade to receive below-grade horizontal insulation.
- .9 Do not enclose insulation until it has been inspected and approved by Consultant.

3.3 Examination

- .1 Examine substrates and immediately inform Consultant in writing of defects.
- .2 Prior to commencement of work ensure that substrates are firm, straight, smooth, dry, free of

snow, ice or frost, and clean of dust and debris.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 ASTM C 665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .3 ASTM C 1320-05, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .2 Canadian Standards Association (CSA International): CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .3 Underwriters Laboratories of Canada (ULC): CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures. - PRODUCTS

1.3 INSULATION

- .1 Install Insulation as follows (unless otherwise noted on the drawings):
 - .1 Exterior Cavity Wall Assemblies: 100mm Rockwool Cavity Rock DD.
 - .2 Exterior Framed Cavity Wall Assemblies: Rockwool Comfortball
 - .3 Insulation for Curtain Wall System and Metal Panels: 100mm Rockwool Curtain Rock
 - .4 All interior Wall Partitions: Rockwool AFB (Acoustical Fire Batts).

1.4 ACCESSORIES

- .1 Insulation clips: Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
- .2 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.
- .3 Staples: 12 mm minimum leg.
- .4 Tape: as recommended by manufacturer.

PART 2 - EXECUTION

2.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

2.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to

ASTM C 1320.

- .2 Completely fill cavities with insulation where indicated on drawings.
- .3 Lap ends and side flanges of membrane over framing members. Retain in position with insulation clips installed as recommended by manufacturer. Tape seal butt ends and lapped side flanges. Do not tear or cut vapour barrier.
- .4 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .5 Do not compress insulation to fit into spaces.
- .6 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.
- .7 Do not enclose insulation until it has been inspected and approved Consultant.

2.3 INSTALLATION OF SEMI-RIGID CAVITY WALL INSULATION

- .1 Apply the specified 100 mm thick semi-rigid insulation to the outer face of the inner wythe of cavity walls over Blueskin air barrier with both, adhesive and mechanical fasteners.
- .2 Make applications at temperatures over 5 degrees C. only.
- .3 Ensure air barrier has cured prior to installation of insulation.
- .4 Apply adhesive to the insulation boards in continuous strips running from one side of the board to the other in a serpentine patterns to restrict movement of air behind the insulation. Strips shall be placed 15 cm (6") apart and applied in a 12 mm (2") diameter bead. Press insulation firmly into place to ensure full contact with substrate.
- .5 Butt panels together firmly to seal edges. Where masonry cavity wall ties occur at insulation joints, ensure a snug fit of insulation boards around penetrating ties.
- .6 Stagger joints.
- .7 Press into place firmly with a sliding motion to ensure full contact with substrate.
- .8 Strike off excess adhesive.
- .9 Insulation shall be installed in a continuous unbroken manner. Make terminations of insulation tight, using adhesive, where it abuts other surfaces. Make insulation tight against all penetrating items by using adhesive.
- .10 Do not enclose insulation until it has been reviewed by the Consultant.
- .11 Provide minimum six (6) mechanical fasteners at edges and field of insulation boards, provide additional fasteners at all building corners and bottom row of insulation.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Urethane Foam Contractors Association Inc. (CUFCA)
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-07, Standard Methods of Fire Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S705.1-01, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification. Includes Amendment 1.2.
 - .4 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for polyurethane foam sprayed insulation and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS 2015 SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.

1.3 QUALITY ASSURANCE

- .1 Applicators to conform to CUFCA Quality Assurance Program.
- .2 Qualifications:
 - .1 Installer: person specializing in sprayed insulation installations with documented experience.
 - .2 Manufacturer: company with experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.
- .3 Health and Safety Requirements: worker protection:
 - .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
 - .2 Workers must wear eye protection, gloves, dust masks, long sleeved clothing and respirators when applying foam insulation.
 - .3 Workers must not eat, drink or smoke while applying foam insulation.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

- .1 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.
- .2 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
- .4 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 MATERIALS

- .1 Insulation: spray polyurethane to CAN/ULC-S705.1.
- .2 Primers: in accordance with manufacturer's recommendations for surface conditions.
 - .1 Maximum VOC limit 100 g/L to GS-11 Standard.

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 sprayed insulation application 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.

3.2 APPLICATION

- .1 Apply insulation to clean surfaces in accordance with manufacturer's printed instructions and CAN/ULC-S705.2.
- .2 Use primer where recommended by manufacturer.
- .3 Apply sprayed foam insulation in thickness as indicated.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .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.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
 - .1 Remove insulation material spilled during installation and leave work area ready for application of wall board.

END OF SECTION

PART 1 - GENERAL

1.1 EXTENT OF WORK

- .1 Application of Air/Vapour Barrier Membrane at Cavity Walls:
 - .1 Install Air/Vapour at all exterior cavity walls.
- .2 Application of Air/Vapour Barrier Membrane at exterior:
 - .1 Air seal materials to bridge and seal openings and penetrations of window frames, door frames and as indicated on drawings.
 - .2 Perimeter seal between dissimilar materials i.e. roofing and exterior envelope.

1.2 REFERENCES

- .1 CAN/CGSB-51.33-M80 Vapour Barrier, Sheet, for Use in Building Construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 MOCK-UP

- .1 Provide mock-up of air barrier materials
- .2 Construct typical exterior concrete block wall panel 2 m long by 2 m wide, incorporating window frame and sill, insulation, junction with roof vapour retarder; illustrating materials interface and seals.
- .3 Locate where directed by the Consultant.
- .4 Mock-up may remain as part of the work.
- .5 Allow 24 h for inspection of mock-up by Architect before proceeding with air barrier work.

1.5 AMBIENT CONDITIONS

- .1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.6 SEQUENCING

- .1 Sequence work in accordance with Section 01 32 16 - Construction Progress Schedule.
- .2 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.7 WARRANTY

- .1 For sealant and sheet materials, provide warranty for 2 years.

- .2 Warranty: include coverage of installed sealant and sheet materials which:
 - .1 Fail to achieve air tight and watertight seal.
 - .2 Exhibit loss of adhesion or cohesion.
 - .3 Do not cure.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

- .1 Air Vapour Barrier and Flashing Membrane: Blueskin SA as manufactured by Bakor. Where membrane comes in contact with roofing material, select compatible membrane flashing material recommended by the manufacturer.
- .2 Water Resistive Air Barrier Membrane: Blueskin VP160 as manufactures by Bakor or approved equivalent. Where membrane comes in contact with roofing material, select compatible membrane flashing material recommended by the manufacturer.
- .3 Substrate Cleaner: Non-corrosive type as recommended by manufacturer of air barrier.
- .4 Adhesive: Air Block 21 vapour barrier adhesive as recommended by Bakor.

2.2 ACCESSORIES

- .1 Joint Sealing Tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
- .2 Sealants: In accordance with Section 07900 - Sealants. Colour selected by the Architect.

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 GENERAL

- .1 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.
- .2 Install sheet vapour barrier on warm side of exterior wall assemblies to form continuous barrier.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect sheets for continuity. Repair punctures and tears with sealing tape before work is concealed.
- .5 Install Blueskin vapour barrier at roof curbs and through-wall transitions of vapour barriers. Overlap with vapour barriers of different specified type.
- .6 Install polyethylene film under Ground Floor slabs, walls, exterior soffits and other surfaces as noted on drawings, using one layer (or more). Arrange for installation to be followed as soon as possible with covering material, use in roll form with largest width possible, follow manufacturer's instructions.

3.3 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept work of this section.
- .2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.
- .3 Report unsatisfactory conditions to Consultant in writing. Do not start work until deficiencies have been corrected. Beginning of Work implies acceptance of conditions.

3.4 PREPARATION

- .1 Remove loose or foreign matter, which might impair adhesion of materials.
- .2 Ensure substrates are clean of oil or excess dust; masonry joints struck flush, and open joints filled; and concrete surfaces free of large voids, spalled areas or sharp protrusions.
- .3 Ensure substrates are free of surface moisture prior to application of self-adhesive membrane and primer.
- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.5 APPLICATION OF AIR BARRIER MEMBRANE AT CAVITY WALL

- .1 Surface Preparation
 - .1 All surfaces must be clean of oil, dust and excess mortar. Strike masonry joints flush.
 - .2 Concrete surfaces must be smooth and without large voids, spalled areas or sharp protrusions. Concrete must be cured a minimum of 14 days and must be dry before **Blueskin** is applied. Where curing compounds are used they must be clear resin based, without oil, wax or pigments
 - .3 All surfaces to receive **Blueskin** must be primed with **Blueskin Primer**, applied by lambs wool roller, brush or spray equipment at the rate of 1 litre per 2-6m² depending on porosity and texture of surface and allowed to dry for 30 minutes before **Blueskin** is applied. Ensure that all primed surfaces receive **Blueskin** in the same day. Alternatively, prime with **Aquaprime** or **Aquatac**. Allow to dry to a tacky film.
- .2 Application of Membrane
 - .1 Refer to **Blueskin® SA** Guide Specification for detailed application information.
 - .2 **Blueskin® SA** must be lapped a minimum of 50 mm on both sides and end laps. Position membrane for alignment, remove protective film and press firmly into place. When membrane is entirely in place, roll membrane including seams with a counter top roller to ensure full contact. When using membrane with brick ties, position membranes, press in place and cut for ties or projections. Seal around any openings and at leading edge at the end of the days work with **Air-Bloc 21**, **Air-Bloc 21 FR**, **Bakor 230-21**, or **Polybitume® 570-05**.

3.6 EXTERIOR SURFACE OPENINGS

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

3.7 PERIMETER SEAL

- .1 Seal perimeter of sheet vapour barrier as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.8 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier as follows:
 - .1 Attach first sheet to substrate
 - .2 Apply continuous bead of sealant over solid backing at joint
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead
 - .4 Install staples through lapped sheets at sealant bead into wood substrate
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.9 FIELD QUALITY CONTROL

- .1 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.
 - .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.

3.10 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Use mineral spirits. CAUTION: Contains flammable solvents. Take suitable fire precautions. Do not allow smoking or welding in working area. Keep away from heat and open flame. Use in well ventilated areas. Keep containers covered when not in use.
- .3 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.11 PROTECTION OF WORK

- .1 Protect finished work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Do not permit adjacent work to damage work of this section.
- .3 Ensure finished work is protected from climatic conditions.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 52 00 - Modified Bituminous Membrane Roofing.
- .2 Section 06 10 01 – Rough Carpentry – Roofing
- .3 Section 07 62 01 – Sheet Metal Flashing and Trim - Roofing
- .4 Section 07 92 01 – Joint Sealants – Roofing
- .5 Section 06 10 00 – Rough Carpentry.
- .6 Section 07 27 00 – Air Vapour Barriers
- .7 Section 07 21 16 – Batt and Blanket Insulation.
- .8 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .9 Section 07 92 00 – Joint Sealants.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI B18.6.4-1998, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM D 2369-03, Test Method for Volatile Content of Coatings.
 - .2 ASTM D 2832-92(R1999), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
 - .3 ASTM D 5116-97, Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-93.2-M91, Prefinished Aluminum Siding, Soffits and Fascia, for Residential Use.
 - .3 CAN/CGSB-93.3-M91, Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use.
 - .4 CAN/CGSB-93.4-92, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding

- .5 Soffits and Fascia, Prefinished, Residential.
CGSB 93.5-92, Installation of Metal Residential Siding, Soffits and Fascia.
- .4 Canadian Standards Association (CSA International).
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .5 Environmental Choice Program (ECP).
 - .1 CCD-045-95, Sealants and Caulking Compounds.
- .6 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN/ULC-S706-02, Wood Fibre Thermal Insulation for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product data: submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 300mm x 300mm samples of siding material, of colour and profile specified.
- .3 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 All metal cladding works (i.e. site measuring, fabrication & installation) are to be completed by a licenced sheet metal worker registered with the Ontario College of Trades (Construction Sector – Sheet Metal Worker 308-A). Contractor to provide all identification and documentation as requested prior to commencing any works on site.
- .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.

PART 2- PRODUCTS

2.1 STEEL CLADDING AND COMPONENTS

- .1 Exterior Sheet: Factory preformed sheet steel. Corrugated profile equal by Vicwest, corrugation width to match existing. Base steel thickness minimum 0.46 mm (26 gauge), commercial grade, to ASTM A526 and A446 with a galvanized Z275 zinc coating. Factory prefinished with Signature factory precoated paint finish to CSSBI Bulletin #7, 1979. Refer to exterior elevations for colours, colours selected from Vicwest's standard colours.

M1 – Profile and beige colour to match existing metal siding colour. Contractor to verify profile and provide colour sample prior to ordering and allow for selection from the complete range of

colours in the Signature series with factory finish note above.

M2 – Vicwest Gold 56070, corrugation to match existing metal siding. Contractor to verify profile prior to ordering.

M3 – Vicwest Stone Grey 56071, corrugation to match existing metal siding. Contractor to verify profile prior to ordering.

M4 – Vicwest Cambridge White, CL508 (reverse) profile

- .2 Exterior Corners: of same profile, material and finish as adjacent cladding material, factory built and brake formed to required angle, concealed corner brace with hairline exposed joint.
- .3 Accessories: inside corners, drip flashings, jamb trims, conversion moldings, flashings, copings of same material, thickness, finish and colour as exterior siding, factory built and brake formed to details as indicated.
- .4 Exposed joint (perpendicular to profile): ends of cladding sheet shop cut clean and square. Backed with tight fitting filler lapping back of joint, exposed components colour matched to cladding.
- .5 Gaskets: closed cell polyurethane foam, adhesive on two (2) sides, release paper protected.
- .6 Touch-up paint: as recommended by siding manufacturer.
- .7 Isolation Coating: Bituminous paint.
- .8 Sealants: in accordance with Section 07 92 00, colour to match siding panels as selected by Architect.
- .9 Fasteners: purpose made, self-tapping and self-drilling, screws of hardened carbon steel shank with heavy cadmium plating and a chromate finish, length to suit. Provide matching pre-painted and coloured steel heads.
- .10 Sub-girts: (notched “Z-bars” and hat furring sections) of 1.2 mm (18 gauge standard) base thickness steel, commercial grade, to ASTM A446 with a galvanized Z275 zinc coating. Dimensions, profile and spacing as indicated and in maximum lengths.
- .11 Semi-rigid Fibrous Insulation: mineral wool to CAN/CGSB 51.10-92 mineral fibre board thermal insulation, Type 2, Class 4. Thermal resistance, RSI value of 0.76 / 25 mm. Semi-rigid board size 400 mm x 1220 mm by generally 88 mm thickness (see drawings for other thicknesses) with square edges. Standard of Acceptance: “Cavity Rock” board insulation as manufactured by Roxul Inc.
- .12 Air and Vapour Barrier: self-adhesive air/vapour barrier membrane equal to “Blueskin SA” as manufactured by Bakor Inc.

2.2 FASTENERS

- .1 Nails: CSA B111. Screws: ANSI B18.6.4. Purpose made cadmium plated steel.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Installation to be in strict accordance with manufacturer's written recommendations and reviewed shop drawings.
- .2 Provide air/vapour membrane to entire substrate in accordance with Section 07 27 00.
- .3 Provide supplemental steel support members for work of this section to suit design requirements.
- .4 Provide supplemental work to resist wind uplift and to provide necessary strength and rigidity to all preformed sheet steel profiles and accents by incorporating braces, anchors, frames, bent supports and tie- ins.
- .5 Install metal "Z-bars" to substrate at centres indicated and corresponding to joint spacing of preformed sheet steel panels and accents/dividers. Secure at 400 mm min. and to suit loading requirements.
- .6 At curved walls provide curved metal "hat" sections to horizontal "Z-bars" or substrate as detailed.
- .7 Ensure all flashings and trims are installed before or immediately after erecting panels and sealed to stop direct weather penetration.
- .8 Install exterior finish siding and dividers to internal sub-girts with matching colour fasteners.
- .9 Ensure continuity of "pressure equalization" of rain screen principle.
- .10 Provide cladding panels in longest practical length. Intermediate joints are not permitted.
- .11 Provide intermediate structural supports, alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.
- .12 Install preformed trim pieces. Provide flashings, trim and sealants as indicated and as required to render work complete and weathertight.

3.3 CLEANING

- .1 Repair and touch-up with colour matching high grade synthetic enamel minor surface damage, only where appearance after touch-up is acceptable to the Architect.
- .2 Replace damaged components which in the opinion of the Architect cannot be satisfactorily repaired.
- .3 Upon completion of work clean exposed surfaces. Remove dirt, grease, oil, caulking material and other foreign matter. Leave surfaces clean and neat, and uniform in colour.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Contractor to provide an original, complete insurance policy identifying specific coverage for torch applied systems.

1.2 RELATED SECTIONS

- .1 Section 06 10 53 – Miscellaneous Rough Carpentry.
- .2 Section 07 21 16 – Blanket Insulation.
- .3 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .4 Section 07 92 00 – Joint Sealants.
- .5 Section 22 05 11 – Plumbing and Drainage.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM C1177/C1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .3 ASTM C1396/C1396M-13, Standard Specification for Gypsum Board.
 - .4 ASTM D4637/D4637M-14e1, Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CGA-8.1-M86 (R2011), Elastomeric Composite Hose and Couplings for Conducting Propane and Natural Gas.
 - .2 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt. (updated)
 - .3 CAN/CSA-A123.4-04 (R2013) - Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
 - .4 CSA A123.22-08(r2013), Self-Adhering Polymer Modified Bituminous Membrane Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - .5 CSA A123.23-15 - Product specification for polymer-modified bitumen sheet, prefabricated and reinforced.
 - .6 CSA A231.1-14/A231.2-14, Precast Concrete Paving Slabs / Precast Concrete Pavers.
 - .7 CSA B149.1-10 (R2015), Natural Gas and Propane Installation Code
 - .8 CSA B272-93 (R2000), Prefabricated Self-Sealing Roof Vent Flashings.
 - .9 CSA O151-09, Canadian Softwood Plywood.
- .3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.108-M89, Bituminous Solvent Type Paint.
- .2 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
- .3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .4 Factory Mutual (FM Global)
 - .1 Hot Work Permit Form F2630.
 - .2 FM 4450, Approval Standard for Class 1 Insulated Steel Roof Decks.
- .5 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S107-10, Standard Methods of Fire Tests of Roof Coverings.
 - .2 CAN/ULC-S126-06, Standard Method for Test for Fire Spread Under Roof Deck Assemblies.
 - .3 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .4 CAN/ULC-S702.2-03, Standard for Mineral Fibre Thermal Insulation for Buildings.
 - .5 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .6 CAN/ULC-S705.1-01, Standard for Thermal Insulation – Spray-Applied Rigid Polyurethane Foam, Medium Density.
 - .7 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density – Application.
 - .8 CAN/ULC-S770-09, Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Convene pre-installation meeting one week prior to beginning roofing Work, with roofing 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.

1.5 COORDINATION

- .1 Coordinate work of this Section with related work specified in other Sections to ensure construction schedule is maintained and water tightness and protection of the building and finished work is maintained at all times.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 System summary:

- .1 Provide a one page synopsis of each roof type that lists the assembly components in order from top to bottom.
- .3 Product Data:
 - .1 Provide two copies or an electronic copy of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations for all products to be incorporated in the new system.
 - .2 Provide two copies or an electronic copy of WHMIS 2015 Safety Data Sheets to Consultant for:
 - .1 Primers.
 - .2 Sealers.
 - .3 Liquid membrane.
 - .4 Adhesives.
- .4 Provide shop drawings:
 - .1 Indicate sloped insulation layout and details.
 - .2 Provide shop drawing or submittal indicating adhesive pattern specified by adhesive manufacturer for the required wind uplift pressures indicated on the Drawings.
- .5 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.7 QUALITY ASSURANCE

- .1 Installer qualifications: Company or person specializing in application of modified bituminous roofing systems with 5 years documented experience, approved by manufacturer.
- .2 Only certified applicators are permitted to use torch welding equipment.
- .3 Hold a pre-installation meeting prior to the start of roofing works, with the roofing contractor's representative and the Consultant, to review installation conditions particular to this project.
- .4 Roof membrane manufacturer shall delegate a representative to visit the work site at the start of roofing installation. Contractor shall engage membrane manufacturer's technical representative as required to provide technical guidance for and inspection of membrane application. The Contractor shall at all times enable and facilitate access to the worksite by this representative.

1.8 FIELD QUALITY CONTROL

- .1 Water Testing:
 - .1 In the event the Consultant deems any of the Work to be deficient, provide water test of all flashing, projections, equipment on roof and roofing system. Co-ordinate test with the Owner's operations personnel.
 - .2 Contractor is to assume all costs of testing and correction.

.2 Adhesion Testing:

- .1 If requested by the Consultant, at each roof drainage area, following installation of membrane base sheet, carry out adhesion tests to confirm adhesion of membrane to substrate and substrate layers to each other, down to first mechanically attached layer.
- .2 Locations and timing of tests will be directed by Consultant. Provide labour and materials as required to assist Consultant in conducting tests.
- .3 If inadequate adhesion is found, conduct further testing to determine the extent of the inadequate adhesion. Replace all defective areas to the satisfaction of the Consultant. Replace substrate materials as necessary with new materials, and patch cut tests with membrane patches extending at least 150 mm beyond the cut.
- .4 Contractor is to assume all costs of testing and correction.

.3 Sample Testing:

- .1 If requested by the Consultant, at each roof drainage area, following installation of membrane base sheet, carry out sample tests to confirm materials and installation of roof assembly components. Sample size to be 300 mm x 300 mm.
- .2 Locations and timing of tests will be directed by Consultant.
- .3 If inadequate construction is found, conduct further testing to determine the extent of the inadequate adhesion. Replace all defective areas to the satisfaction of the Consultant. Replace substrate materials as necessary with new materials, and patch cut tests with membrane patches extending at least 150 mm beyond the cut.
- .4 Contractor is to assume all costs of testing and correction.

1.9 FIRE PROTECTION

.1 Fire Extinguishers:

- .1 Pressure rechargeable type with hose and shut-off nozzle,
- .2 ULC labeled for ABC class protection.
- .3 ULC labeled for A class protection, for wood, paper and fibreboard.
- .4 Size 14 kg.
- .5 Have one fully charged ABC extinguisher and one fully charged Type A extinguisher on roof per torch applicator, within 3 m of the propane source.

- .2 Maintain fire watch for 2 hours after each day's torching operations cease.

1.10 GENERAL REQUIREMENTS

- .1 Comply with the General Requirements, General Instructions and Supplementary Conditions.

- .2 Execute work in accordance with this Section and other related Sections, Drawings and Details.
- .3 Attach roofing to structure to meet requirements of insurance underwriter and authorities having jurisdiction.
- .4 Regard manufacturer's printed recommendations as minimum requirement for materials, methods and workmanship not otherwise specified.
- .5 Contact the Consultant if the specifications conflict with the manufacturer's recommendations. Otherwise it will be assumed that the Contractor and manufacturer are in agreement with procedures outlined.
- .6 Advise the Consultant of adjustments to specified roofing procedures caused by weather and site conditions. Make adjustment to specified procedures only after review with the Consultant.
- .7 Maintain equipment in good working order to ensure control of roofing operations and protection of work. Types of roofing equipment and laying techniques to be employed are to meet the approval of the Consultant.
- .8 Do not penetrate roof deck with any fastening devices that would do damage or impair the function of the assembly or of any interior service.
- .9 All temporary drains shall be connected with a mechanical connection (MJ coupling) or a U-flow connection, until new drains are installed.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage, and disposal of, sealing compounds, primers and caulking materials.
- .3 Manufacturer's recommendations for handling and storing products are to be considered a minimum requirement.
- .4 Materials shall be delivered to the site, undamaged and in their original packages, with manufacturer's labels visible, attesting to their conformity to specific standards.
- .5 Ensure that shelf life of materials has not expired.
- .6 Remove damaged material from site and replace all rejected materials with new product.
- .7 Elevate on raised platform and store as to prevent deformation of materials.
- .8 Provide and maintain dry, off-ground weatherproof storage.

- .9 Store rolls of membrane in upright position. Store membrane rolls with selvage edge up.
- .10 Remove only in quantities required for same day use.
- .11 Place plywood runways over completed Work and over areas not in Contract, as required, to enable movement of material and other traffic.
- .12 Store sealants at +5°C minimum.
- .13 Protect insulation by slitting manufacturer's packaging and installing a waterproof UV-resistant tarp.
- .14 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.
- .15 Avoid stockpiling of materials or use of equipment on decks in a way which could cause overloading.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Ensure protection of products that are sensitive to damage by moisture. Do not work during rain, snow or fog. Stop work and make watertight before the onset of inclement weather or when weather appears imminent.
- .2 Ensure protection of the building from weather at all times. If inclement weather is forecast or appears imminent, postpone work that would risk the building from moisture damage.
- .3 If it becomes apparent that work would threaten the building watertightness, the Owner has the right to stop work. Any additional expenses due to work stoppage or postponement of work will be at the Contractor's expense.
- .4 Ambient Conditions
 - .1 Do not install roofing when ambient temperature remains below -18°C for torch application.
 - .2 Minimum ambient temperature for solvent-based adhesive is -5°C.
- .5 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.13 COMPATIBILITY

- .1 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a complete assembly. Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.
- .2 Defective work resulting from work with incompatible materials will be considered the responsibility of the Contractor.

- .3 Repair all work that could result in damage or interfere with performance.

1.14 EXISTING SUBSTRATES

- .1 Following removal of existing material to the substrate, inspect the deck for soundness and notify the Consultant of any deck found unsound and not suitable for roofing. Do not commence work until conditions are documented and the Consultant rules on the acceptability of surfaces and/or corrective measures required. The cost of any delays due to postponement of work that results from investigating the site problem or obtaining a ruling will be at the Owner's expense.
- .2 The commencement of work is proof that the Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed work.
- .3 Defective work resulting from application of material on unsatisfactory surfaces will be considered the responsibility of the Contractor.
- .4 The Contractor will be responsible for all repairs, costs and pay all cost and fees required to rectify damage or defective work. Use materials and finish to match the original preconstruction conditions.

1.15 DAILY OPERATIONS

- .1 Unless otherwise specified, complete the entire roofing operation up to line of termination of each day's work, as required by design intent, in order to safeguard and protect the work and building from damage and weather.

1.16 EXAMINATION

- .1 Before proceeding with roofing application, ensure that:
 - .1 All surfaces are clean and free of debris, snow, frost and moisture.
 - .2 The deck is clean and sufficiently dry to ensure specified adhesion will be obtained.
 - .3 Adjacent construction and installation of related work (i.e. curbs, drains, penetrations, wood nailers, etc.) incorporated with the roof are complete.
 - .4 Roof deck is sound, existing fasteners are tight and irregularities are corrected to provide a suitable surface for new roofing.
- .2 Ensure substrate is smooth. Remove sharp edges or protrusions that could impair the function of the roof assembly.
- .3 Inform Owner/Consultant in writing of any defects.

1.17 DRAINS AND DRAINAGE PLANE

- .1 Inspect surfaces and ensure that roof deck is level or sloped to drains in conforming to design intent.

- .2 Inspect surfaces and ensure that roof drains are set at a level to drain and are connected or capped.
- .3 Take spot levels to verify that pools of water in excess of 13 mm depth will not form.
- .4 Tabulate levels and submit to Consultant.
- .5 Ensure plumbing is accessible and work can be completed as specified.
- .6 Inspect roof drains to ensure they are open and working properly.
- .7 Where specified or shown for areas with only one drain, provide overflow scuppers or drains to detail and specified requirements.

1.18 EXAMINE UNDERSIDE OF DECK

- .1 Inspect the underside of deck to ensure fasteners will not damage the structure, affect interior surfaces or electrical and mechanical services.
- .2 For drain alterations and pipe hangers, coordinate with plumbing subtrade as per Section 22 05 11 – Plumbing and Drainage, prior to commencement of roofing operations.

1.19 HIDDEN SERVICES

- .1 Investigate the location of all known hidden services by reviewing interior conditions, plans, specifications and drawings for the original building, any subsequent alterations, completion of cut tests and interviewing those involved in the construction and maintenance of building services. These services include but are not limited to mechanical, electrical, cable, communication, computer, security or roof assembly. Ensure all services are located and will be protected from damage under the Contract. In some cases, services may be located over the roof deck and within the roof assembly. Notify Owner/Consultant in such occurrence and proceed with installation as directed.

1.20 EQUIPMENT

- .1 Inspect equipment affected by the work, including but not limited to rooftop equipment, curbs, existing drains and plumbing, mechanical, electrical and lightening protection services, to ensure they are in good repair and working order. Record any damage and advise the Consultant.
- .2 During re-roofing, ensure that all mechanical equipment, ducts, pipes, etc. are properly supported.
- .3 Notify Owner and/or Consultant of any equipment which is not operational or damaged prior to the commencement of work.

1.21 ADVISE CONSULTANT

- .1 Advise the Consultant of any unusual circumstances affecting the work. Notify the Consultant of any defective or malfunctioning equipment or drainage deficiencies. Do not commence work until defects and incorrect levels have been verified and rectified.

1.22 PROTECTION OF ROOFTOP EQUIPMENT

- .1 Remove any equipment and flashing intended for re-use and save from harm. Store in approved location and reset at project conclusion unless specified or shown to be removed.
- .2 Protect all openings, vents and stacks from weather and contamination from debris.
- .3 Provide temporary plumbers plugs to protect drains during roofing operations. Ensure that temporary protection is removed at completion of work period and/or at the end of each days work.

1.23 SERVICES

- .1 Services are to be left operational unless otherwise authorized by the Owner.
- .2 Unless otherwise specified, the Contractor will be responsible for disconnection, relocation, re-installation and extending all services required to facilitate work under this Contract. Co-ordinate work with the Owner and provide minimum of 48 hours notification if services are to be interrupted.
- .3 Contractor to verify location of services prior to commencement of work. Notify Owner/Consultant of any unusual conditions.
- .4 The Contractor and their employees must hold valid certificates for the work undertaken.
- .5 Complete work of this Section as required by local authorities having jurisdiction. Have work inspected and pay all fees relative to such inspection to ensure work meets with published standards and codes.
- .6 Submit Certificate or Letter of Approval by authority responsible for the work to the Owner and Consultant with final documentation.
- .7 All fans, air handling units, and any electrical equipment affected by the replacement of the roof sections under this Section, whether disconnected or extended must be inspected by an ESA representative to verify the integrity of the existing wiring and/or the new installation.

1.24 WARRANTY

- .1 Contractor's Warranty for Labour and Material:

- .1 For Work of this Section 07 52 00 - Modified Bituminous Membrane Roofing, and all associated roofing work, the 12 months warranty period is extended to 60 months.
 - .2 Make all necessary repairs and replacements within 48 hours of receipt of written notification.
 - .3 Nothing contained in this Article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.
 - .4 Provide these written warranties, confirming above, issued on the corporate letterhead, signed and sealed by an authorized signing officer. The warranties will specifically reference the name of the building, address and the name of the owner.
- .2 Manufacturer's Warranty:
- .1 Provide a 15-year full system warranty.
 - .2 The contractor is to ensure all materials selected for use on the project are in full compliance with the terms and conditions of the manufacturer's warranty requirements.

Part 2 Products

2.1 GENERAL

- .1 All standards, regulations and specifications listed herein are considered to be the latest available edition.
- .2 All materials are to be supplied in compliance with system manufacturer warranty requirements. Acceptable system manufacturers:
 - .1 Soprema.
 - .2 IKO Industries Ltd.
 - .3 Henry Bakor.
 - .4 Johns Manville.

2.2 ROOF DECK SHEATHING MATERIALS

- .1 Glass mat gypsum sheathing: Glass mat faced treated core gypsum roof board, for installation over steel deck to ASTM C1177/C1177M. Boards to be 1.2 m x 2.4 m, thickness as indicated, with pre-primed surface where indicated.
 - .1 Standard of acceptance:
 - .1 DensDeck Roof Board by GP Gypsum.
 - .2 Securock by USG.
 - .3 Or accepted alternate.

2.3 PRIMERS

- .1 Asphalt Primer: To manufacturer's recommendations.

- .2 Self-adhesive membrane primer. As recommended by membrane manufacturer. Use low VOC, polymer emulsion-based primer, unless directed otherwise by Consultant on site.

2.4 AIR/VAPOUR BARRIER MEMBRANE

- .1 For torchable gypsum board surfaces:
 - .1 Torch grade styrene-butadiene-styrene (SBS) to CSA A123.23, with polyester or glass fleece reinforcement, minimum thickness 3.5 mm, top side sanded.
 - .1 Type A, B or C.
 - .2 Grade 3.
 - .3 Top and bottom surfaces: sanded top surface and thermofusible plastic film bottom surface.

2.5 SELF-ADHERED MEMBRANE

- .1 Self-adhered membrane: To CSA A123.22, self-adhering membrane consisting of SBS rubberized asphalt compound laminated to a polyethylene film. Minimum thickness 1 mm.
 - .1 Standard of acceptance:
 - .1 Lastobond Shield HT by Soprema.
 - .2 PE200HT by Henry.
 - .3 AquaBarrier™ AVB by IKO.

2.6 MEMBRANE AND MEMBRANE FLASHINGS

- .1 Base sheet membrane (non-combustible substrates): Torch grade styrene-butadiene-styrene (SBS) to CSA A123.23, with polyester or glass fleece reinforcement, minimum thickness 3.0 mm.
 - .1 Type B or Type C.
 - .2 Grade 3.
 - .3 Top surfaces: Thermofusible plastic film.
 - .4 Bottom surfaces: Thermofusible plastic film.
- .2 Self-adhesive base sheet membrane flashing (combustible substrates): styrene-butadiene-styrene (SBS) to CSA A123.23, with polyester or glass fleece reinforcement and release paper, minimum thickness 3.0 mm.
 - .1 Type B or Type C.
 - .2 Grade 2.
 - .3 Top surfaces: Thermofusible plastic film.
 - .4 Bottom surfaces: Self-adhesive with release paper.

- .3 Cap sheet membrane and membrane flashing: Torch grade styrene-butadiene-styrene (SBS) to CSA A123.23, with polyester or glass fleece reinforcement, minimum thickness 4.0 mm.
 - .1 Type B or Type C.
 - .2 Grade 1, granule surfaced. Colour for granular surface: brown.
 - .3 Grade 1, standard service.
 - .4 Bottom surface thermofusible plastic film.
- .4 Fireguard tape:
 - .1 Modified bituminous membrane supplied in strips, 150 mm wide, 1.6 mm thick, glass fleece reinforced with self-adhesive underside.
 - .2 Provided by membrane manufacturer.

2.7 LIQUID MEMBRANE

- .1 Two-component methacrylate or one component polyurethane/bitumen resin, solid content 80% or greater, compatible with roof membrane.
 - .1 Standard of acceptance:
 - .1 Alsan Flashing by Soprema.
 - .2 MS Detail by IKO.
 - .3 PermaFlash by Johns Manville.
 - .4 Or accepted alternate.
- .2 Reinforcement mesh: As recommended by liquid membrane manufacturer.

2.8 ADHESIVES

- .1 Adhesive for securing overlay board and insulation: To be fully compatible with all materials in the roofing assembly. Applicability of use to adhere the different materials in the roofing assembly to be included in the manufacturer's literature.
 - .1 Standard of acceptance:
 - .1 Duotack by Soprema.
 - .2 Millenium by IKO.
 - .3 Fas-n-free by Tremco.
 - .4 Insta-Stick by Instafoam Inc.
 - .5 Roof Assembly Adhesive by Chemlink.
 - .6 Olybond 500 by OMG.
 - .7 2-Part UIA by Johns Manville.
 - .8 Or accepted alternate.

2.9 POLYISOCYANURATE INSULATION (INORGANIC)

- .1 Conforming to CAN/ULC S704, rigid foam board, Class 2 or 3, Type 3. Manufactured with HC blowing agent meeting requirements of CAN/ULC S126, CAN/ULC S107 and CAN/ULC S770 for LTTR values. Approved and listed by Factory Mutual Global for 1-60 and 1-90 wind classification and FM 4450 requirements for Class 1 fire. Thickness as specified or shown with maximum

board size 1200 mm x 1200 mm. Fibre-reinforced **inorganic facers** on both major surfaces of the core foam.

2.10 TAPERED INSULATION (INORGANIC)

- .1 Conforming to CAN/ULC S704, rigid foam board, Class 2 or 3, Type 3. Manufactured with HC blowing agent meeting requirements of CAN/ULC S-126, CAN/ULC S107 and CAN/ULC S770 for LTTR values. Approved and listed by Factory Mutual Global for 1-60 and 1-90 wind classification and FM 4450 requirements for Class 1 fire. Thickness as specified or shown with maximum board size 1200 mm x 1200 mm. Fibre-reinforced **inorganic facers** on both major surfaces of the core foam.
- .2 Insulation slopes shall be as indicated on the detailed drawings and roof plans. Modules shall be factory cut to correct slopes.
- .3 Sloped insulation must terminate at 0 thickness. Supply an additional nosing piece if required, factory fabricated of compatible, flame-resistant sloped rigid insulation material, to smoothly terminate sloped insulation at 0 thickness.

2.11 OVERLAY BOARD

- .1 Overlay board: 6 mm thick asphalt based overlay board with non-woven glass facers, as recommended by the membrane manufacturer.

2.12 SEMI-RIGID MINERAL WOOL INSULATION

- .1 To Section 07 21 16, Blanket Insulation.

2.13 SPRAYED POLYURETHANE INSULATION

- .1 To Section 07 21 29.03, Sprayed Insulation - Polyurethane Foam

2.14 SEALERS

- .1 Plastic cement: Asphalt, to CAN/CGSB-37.5.
- .2 For sealants, mastic, adhesives or caulk, refer to Section 07 92 00 – Joint Sealants.

2.15 WALKWAY MATERIALS

- .1 Walkways are to be composed of each of the following materials:
 - .1 One additional ply of sacrificial cap sheet membrane.
 - .2 Rubber protection pad.
 - .3 Concrete pavers.

2.16 PROTECTION MATERIALS

- .1 Rubber protection pad: Heavy duty grade, 550 mm x 550 mm, 8 mm thick, masticated recycled rubber with reinforcement and UV resistant, dimpled surface.

2.17 MEMBRANE FASTENING BAR

- .1 Galvanized sheet steel or extruded aluminum, thickness 1 mm (20 ga.), 38 mm width, supplied in minimum 2.4 m lengths, with pre-drilled 2 mm holes, secured with #14 stainless steel screws @ 150 mm c/c.

2.18 FASTENERS

- .1 Fasteners for gypsum board to steel deck: No. 12 flat head, self-tapping, Type A or AB, cadmium plated screws. Use fastener plates (see below).
- .2 Fastener plates: FM Global approved 75 mm hexagonal metal plates, 75 mm hexagonal plastic lock plates.
 - .1 Standard of acceptance: Dekfast or Consultant approved alternative.
- .3 Fasteners for exposed metal flashing and cladding to wood or steel: Minimum 38 mm #10 cadmium plated hex head screws, colour matched, with neoprene and steel washers.
- .4 Fasteners for sheet metal into steel: Self-drilling, self-tapping screws, galvanized, #8 or larger size, Tekes or equivalent, head to suit application.
- .5 Fasteners for sheet metal and wood to wood: Corrosion resistant #10 wood screws or nails to suit application.
- .6 Structural fasteners into wood: Lag screws, 12.7 mm diameter hot dipped galvanized steel, length 125 mm.

2.19 PLUMBING VENTS

- .1 Spun aluminum flashing consisting of metal flashing sleeve with integral flange, matching aluminum hood, perforated collar premoulded urethane insulation liner and EPDM base seal. Diameter to suit existing pipe size.
 - .1 Standard of acceptance: SJ-31 Vandal Proof Stack Jack Flashings as manufactured by Thaler, or Consultant approved alternative.

2.20 SPLIT FLASHING FOR PIPE PENETRATION

- .1 Fabricated from 0.48 mm (26 ga.) Type 304, stainless steel, compliant with CSA B272, 2-piece, with EPDM triple pressure grommet seal around cap and continuous EPDM seals at split junctures of sleeve and deck flange, with stainless steel bolted closure design, size to suit structure, 450 mm in height.
 - .1 Standard of acceptance: SPJ-1 by Thaler, or Consultant approved alternative.

2.21 CONDUIT PENETRATION FLASHING

- .1 Consists of metal flashing sleeve with bent integral flange, pre-molded urethane insulation liner, EPDM triple pressure grommet seal & EPDM base seal.
 - .1 Material: Aluminum
 - .2 Standard of acceptance: MEF-2A by Thaler, or Consultant approved alternative.

2.22 B-VENT BASE FLASHING AND STORM COLLAR

- .1 Rain collar to be shop fabricated from 0.61 mm (24 ga.) galvanized sheet, to be same material as base flashing, 100 mm girth, with integral tightening clamp.

2.23 CONCRETE PAVERS

- .1 Concrete pavers: To CSA A231.1, 600 x 600 x 50 mm thick of sizes indicated natural, air entrained precast concrete paving slabs having non-slip finish with 51 mm plain margin around perimeter.

2.24 PREFABRICATED INSULATED ROOF CURB

- .1 Prefabricated roof curb to be manufactured of prime galvanized steel construction, 1.2 mm (18 ga.) steel thickness, meeting ASTM A653/653M, with welded corners and with seams joined by continuous water and airtight welds. Roof curb shall be internally reinforced with angles 600 mm on center and factory installed wood nailer. Internally insulated with 38 mm thick 0.53 kN/m³ (3 pcf). density rigid insulation. Heights to be as detailed to suit installed roof thickness. Top of all roof curbs shall be level, with pitch built into curb when deck slopes.

2.25 ROOF ACCESSORIES

- .1 Miscellaneous clamps: For extending gas piping services to CAN/CGA-8.1-M86.
- .2 Bituminous metal paint: To isolate metal from concrete and masonry surfaces, to CAN/CGSB-1.108-M89 Type II.
 - .1 Standard of acceptance: 810-07 by Henry Inc. or Consultant approved alternative.
- .3 Pile weatherstripping: Vinyl and pile, external attachment to door sill, adjustable.

Part 3 Execution

3.1 QUALITY OF WORK

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual.
- .2 Do priming in accordance with manufacturer's written recommendations.
- .3 Fit the interface of all walls and roof assemblies with durable rigid material sheet metal or plywood providing connection point for continuity of air barrier.

- .4 Make assembly, component and material connections in consideration of appropriate design loads, with reversible mechanical attachments.
- .5 In the event that any product contains a manufacturing defect or anomaly, the Contractor shall notify the Consultant and manufacturer immediately and request direction.

3.2 REMOVAL OF EXISTING ROOFING

- .1 Remove all roofing, flashing and insulation materials down to deck. Leave existing blocking and parapet construction in place where indicated. Where a built-up air/vapour barrier is present, remove this from the deck unless agreement is otherwise obtained from the Consultant to leave in place.
- .2 Remove existing rooftop equipment where indicated.

3.3 EXAMINATION OF ROOF DECKS

- .1 Verification of Conditions:
 - .1 Inspect with Consultant deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.
- .2 Evaluation and Assessment:
 - .1 Prior to beginning of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
 - .2 Curbs have been built.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall or when such weather is imminent.

3.4 MECHANICAL EQUIPMENT DISCONNECTION / MODIFICATION / RECONNECTION

- .1 Perform disconnection, extension, modification, and reconnection of mechanical equipment in accordance with drawings provided. Work shall be performed by a licensed trade sub-contractor. Obtain approval from Consultant prior to making adjustments not scheduled.
- .2 In general, Contractor is responsible for disconnection extension, modification, and reconnection of all operating HVAC equipment in work area. Owner is responsible for disconnection (at interior) of those mechanical items indicated for removal by Contractor.

- .3 All mechanical equipment must be properly tagged out of service (especially where gas is present). ESA certificates are required for all mechanical and electrical reconnections.

3.5 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover walls, walks and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of Work.
- .3 Protect roof from traffic and damage. Comply with precautions deemed necessary by Consultant.
- .4 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.
- .5 Metal connectors and decking will be treated with rust proofing or galvanization.
- .6 Fit the interface of the walls and roof assemblies with durable rigid material sheet metal or plywood providing connection point for continuity of air barrier.

3.6 PRIMING

- .1 Unless otherwise indicated or directed by Consultant, prime all surfaces which will be in direct contact with bituminous materials at the rate of 0.15 L/m² to manufacturer's recommendations. For self-adhering membrane, install primer at a rate recommended by manufacturer. Ensure that surfaces are tack-free before proceeding.
- .2 Limit quantity of primer at deck openings and points of termination and provide supplemental protection to prevent bleedthrough to the building interior.
- .3 Roll primer into surface.
- .4 Re-prime all surfaces, including pre-primed surfaces, that become contaminated with dust or become marred due to their exposure to roof traffic or weather.

3.7 INSTALLATION OF GYPSUM BOARD SHEATHING

- .1 Attach boards as per the OBC Wind Uplift Attachment detail illustrated on the drawings.
- .2 Install boards as detailed and specified with primed or top side up.
- .3 Over steel deck, place with long axis of each sheet transverse to steel deck ribs with end joints staggered and fully supported on ribs.
- .4 Cut sheets as required to suit site conditions.
- .5 Butt joints tightly. Use maximum size pieces where possible to reduce joints.

3.8 MECHANICAL FASTENERS FOR SHEATHING (STEEL DECK)

- .1 Attach boards as per the OBC Wind Uplift Attachment detail illustrated on the drawings.
- .2 In compliance with specified requirements, use mechanical fasteners to secure boards in place.
- .3 Inspect the underside of the deck to ensure fasteners will not be visible, damage the structure or interior surfaces, affect electrical and mechanical services. Fasteners to penetrate top flute of the deck maximum 20 mm.
- .4 Advise Consultant of any unusual circumstances affecting the work. Be responsible and correct all damage caused by work to match existing materials and finish.
- .5 Secure to top flute of steel deck with screws spaced in pattern specified. Use screw-type anti-backout corrosion resistant fasteners with 75 mm metal plates as generally approved or required by the fastener manufacturer.
- .6 Prime metal plates that will be covered with bitumen roofing. Ensure primer is tack-free before proceeding.

3.9 AIR SEALS

- .1 Install 0.56 mm (26 ga.) galvanized or 0.51 mm (26 ga.) pre-finished metal air seal where indicated. Mechanically secure metal to deck and extend as required to allow a minimum 100 mm tie-in with air/vapour barrier membrane. Lap and seal air/vapour barrier membrane onto air-seal.

3.10 TORCH-APPLIED AIR/VAPOUR BARRIER ON SHEATHING

- .1 Ensure all surfaces to be covered with self-adhering membrane are complete and free of moisture and contaminants and surfaces are above 5°C (40°F). At temperatures below 5°C (40°F) heat materials to be covered with hot air gun. Store all materials in heated storage when temperatures fall below 5°C (40°F) and remove only as much material that can be used before cooling.
- .2 Prime all vertical surfaces to be covered with torch-applied membrane, and horizontal surfaces as required. Use roller application – no spray application permitted. Let primer tack dry and complete thumb test to test set-up.
- .3 Use fireguard tape or overlay board to protect all joints in substrate and all combustible surfaces.
- .4 Working up slope from drain, install air/vapour barrier membrane using torch methods, true to line to completely cover the area intended to be protected to points shown on the drawing.
- .5 Membrane is to be installed without air blisters and wrinkles. Rework, repair or replace all poorly installed membrane. Do not stretch material that would result in pullback and deformity of the membrane at intersections.

- .6 Lap all side laps 75 mm and end laps 150 mm. Torch all seams to achieve bleedout. At nailable surfaces, secure all membrane on vertical surface at points of termination at 150 mm c/c, using large head roofing nails.
- .7 Turn up membrane 150 mm at edge where horizontal surface meets vertical planes. Lap onto existing surfaces as required to provide continuity of air/vapour barrier at terminations. Use fireguard tape or overlay board to protect all open joints in deck and all combustible surfaces
- .8 Seal all points of termination at horizontal planes and vertical surfaces with modified sealant. Tool sealant to consistent smooth and even surface.
- .9 Seal all perimeters and penetrations, and ensure drains are operational and prevent backflow, if air/vapour barrier is to be left exposed as an overnight temporary waterproofing.

3.11 INSULATION – ALL LAYERS – ADHESIVE ADHERED

- .1 Attach insulation as per the OBC Wind Uplift Attachment detail illustrated on the drawings.
- .2 Install base insulation layer over air/vapour barrier to specified design intent and thickness. Secure insulation laid with adhesive, in pattern as per adhesive manufacturer's directions and as indicated. Apply boards before adhesive cures, skims over or loses adhesive qualities.
- .3 For subsequent layers of insulation, secure insulation laid with adhesive, in pattern as per adhesive manufacturer's recommendations and as indicated.
- .4 Stagger all joints of insulation a minimum 300 mm.
- .5 Stagger both end and side joints between insulation layers.
- .6 Butt sheets of insulation with moderate contact. Do not force insulation into place. Cut neatly at projections and points of termination. Replace all broken, damaged or misfit boards as work progresses.
- .7 Where necessary, back-cut insulation to allow it to conform and stay bonded to irregular surfaces without bridging. Subsequent to placement, walk insulation into place to ensure positive bonding is achieved.

3.12 TAPERED INSULATION

- .1 Attach boards as per the OBC Wind Uplift Attachment detail illustrated on the drawings.
- .2 At all locations of tapered insulation provide shop drawings from sloped insulation manufacturer for Consultant's review prior to installation.
- .3 At all new and existing drain locations, provide tapered polyisocyanurate insulation sump around drain to promote positive drainage. Total sump size to be

as shown on drawings, with maximum depression of 25 mm, unless otherwise indicated.

- .4 Installation methods for tapered insulation to be same as for upper layers of base insulation, using adhesive as specified.
- .5 At the low termination of tapered insulation, when applying overlay board, Contractor shall increase adhesive application by adding 4 additional ribbons at 100 mm spacing at the 13 mm elevation change from tapered to flat insulation, to compensate for the 13 mm elevation change of tapered insulation.

3.13 OVERLAY BOARD

- .1 Attach boards as per the OBC Wind Uplift Attachment detail illustrated on the drawings.
- .2 Adhere overlay board to insulation with adhesive at the rate and pattern specified, as for insulation.
- .3 Place boards in parallel rows with end joints staggered. Tape joints in overlay board with fireguard membrane where combustible surfaces are directly below.
- .4 Where overlay board is specified on nailable vertical surfaces, secure overlay board using large-head roofing nails at 200 mm centres each direction and tape all joints with fireguard tape.

3.14 MODIFIED BITUMINOUS MEMBRANE - GENERAL APPLICATION

- .1 Inspect and seal all substrates to eliminate fire hazard. Use fireguard tape as required or recommended by manufacturer.
- .2 Mechanical spreaders are not permitted to install modified membranes.
- .3 Use only bitumen, sealants, adhesive or mastics as specified by membrane manufacturer. Provide written approval from manufacturer when proposing any alternatives or substitutions.
- .4 Lay out all sheets as to allow them to relax a minimum of 30 minutes. When temperatures are below 4.4°C keep and lay out rolls in heated storage. Install rolls before temperature fallback of the sheet occurs.
- .5 Roof membrane to be installed in one sheet if possible.
- .6 Lay all membrane starting at low point to ensure that seams do not face water flow. Roll all membrane into place, true to line, free of buckles, air pockets, fishmouths and tears.
- .7 Overlap all end laps minimum 150 mm and side laps 75 mm.
- .8 Offset all side laps between plies by 50%.
- .9 Offset all end laps between plies minimum 1200 mm.

- .10 At valley locations, run membrane continuously with the slope of the main roof. Lay out all sheets to ensure minimum side laps are maintained through valley area and short section of roof beyond. At these locations the side laps for the main roof will increase. Install membrane to details and Consultant's direction onsite.
- .11 Ensure that a watertight seal is achieved at all overlaps and points of termination.
- .12 Carry base sheet flashing over face of building as shown on the drawings.
- .13 Carry membrane up all vertical surfaces to point shown. Cut off corners at 45° at end laps to be covered by the next roll prior to installation of following sheet.
- .14 Verify procedure with Consultant on site. Seal fasteners through membrane immediately with Type 'A' sealant.
- .15 Do not walk on membrane during applications and until sufficient cooling has taken place as to allow for traffic without doing damage or marking surface.

3.15 BASE SHEET (TORCH APPLICATION)

- .1 Install 1-ply base sheet membrane running with the roof slope, starting at the low point. Layout roll in place to verify alignment and proper overlap and re-roll prior to torching.
- .2 Fully torch in place base sheet membrane using proper application techniques as specified by membrane manufacturer.
- .3 Install membrane true to line and free of wrinkles, air pockets, voids, excessive bitumen flow or other irregularities. Ensure the membrane is not overheated at any location. Should any of these conditions occur, immediately stop membrane application and correct the deficiency before proceeding. Notify Consultant and obtain his approval for proposed repair methods. Questionable areas will require to be cut out and replaced.
- .4 Ensure that a watertight seal of all membrane joints and points of termination is achieved with a torch and trowel.
- .5 Terminate base sheet up all verticals 50 mm, secure on vertical with membrane fastening bar and fasteners @ 150 mm c/c.
- .6 Review base membrane for low areas (ponding) and correct with additional base sheet membrane.

3.16 BASE SHEET FLASHINGS (SELF-ADHERED APPLICATION)

- .1 All flashings to be cut across the roll in 1 m sections. Cut off corners at end laps to be covered by next flashing piece.
- .2 Provide chalk lines and install all membrane true to line. Install gusset reinforcement pieces at all corner locations.

- .3 Ensure wall or eave surfaces are clean and dry, free of contaminants or other irregularities. Re-prime as necessary.
- .4 Commence flashings from the drain or low points and overlap all side laps minimum 75 mm. Base sheet flashings to extend 100 mm onto roof surface and terminate as shown in drawings.
- .5 Place sheet into primer or adhesive and press into place using hand roller to ensure uniform adhesion. Use hot air welder on all seams and joints to ensure a waterproof seal on all points of termination. Apply flashings free of air pockets, voids, wrinkles or fishmouths.
- .6 Prior to the application of cap sheet membranes, secure vertical surfaces of base sheet membrane flashings using fasteners and stress plates secured at minimum 300mm centres. Fasteners are to be covered with 150mm x 150mm membrane reinforcement patch centred on fastener.

3.17 CAP SHEET (TORCH APPLICATION)

- .1 Prior to installation, unroll the cap sheet and check for granular embedment width and alignment.
- .2 Layout membrane to ensure side lap of cap sheet does not occur within 150 mm of roof drain.
- .3 Install specified cap sheet membrane running with the roof slope, starting at the low point. Layout roll in place to verify alignment and proper overlap and re-roll prior to torching. Offset cap sheet side laps 50% to base sheet side laps, ensure lap does not lie within 150 mm of a roof drain.
- .4 Install 1-ply cap sheet membrane full torched in place using proper application techniques as specified by the membrane manufacturer.
- .5 Install membrane by softening both contact surfaces simultaneously with recommended torching equipment. During application, unroll membranes slowly into fluid bitumen ensuring consistent 3 mm to 6 mm flow protrudes each side of the roll.
- .6 Install membrane true to line and free of wrinkles, air pockets, voids, excessive bitumen flow or other irregularities. Ensure the membrane is not overheated at any location. Should any of these conditions occur, immediately stop membrane application and correct the deficiency before proceeding. Notify Consultant and obtain his approval for proposed repair methods. Questionable areas will require to be cut out and replaced
- .7 Using a torch and trowel, embed granules at end laps and where required on surface of cap sheet to ensure proper bonding of membrane overlaps.

3.18 CAP SHEET FLASHINGS (TORCH APPLICATION)

- .1 All flashings to be cut across the roll in 1 m sections. Cut off corners at end laps to be covered by next flashing piece.

- .2 Provide chalk lines and install all membrane true to line. Install base sheet gusset reinforcement at all corner locations.
- .3 Commence flashings from the drain or low points and overlap all side laps minimum 75 mm. Cap sheet flashings to extend 150 mm onto roof surface and terminate as shown in drawings. At wall locations, unless otherwise specified, cap sheet flashings to extend up 50 mm higher than base sheet flashings.
- .4 Where required by Summary of Work and details, install 50 mm wide continuous strip of Type 'A' sealant to the tops of parapets or eaves to prevent bitumen spillage on the building exterior.
- .5 Install membrane by softening both contact surfaces simultaneously with recommended torching equipment. During application, unroll membrane slowly into fluid bitumen ensuring consistent 6 mm flow protrudes each side of the roll.
- .6 Unroll and work sheet into place using torch, trowel and wet sponge to ensure proper placement and adhesion.
- .7 Install membrane true to line and free of wrinkles, air pockets, voids, excessive bitumen flow or other irregularities. Ensure the membrane is not overheated at any location. Should any of these conditions occur, immediately stop membrane application and correct the deficiency before proceeding. Notify Consultant and obtain his approval for proposed repair methods. *Questionable* areas will require to be cut out and replaced.
- .8 Touch up bare spots, corners, scuffs and bleedout runs on cap sheet with granules matching membrane colour, immediately following installation. Use hot air welder, torch or Type 'A' sealant to adhere granules to sheet.

3.19 DRIP FLASHINGS

- .1 Follow manufacturer's recommendations as to whether pre-finished flashings built into the roof are to be primed. When primer is required, prime top and underside of all drip flashings to be incorporated with roofing prior to application. Primer must be compatible with both membrane and finishes on pre-finished flashing material. Use primer supplied by the membrane manufacturer. All primer to be dry before proceeding.
- .2 Fabricate and install metal drip flashings built into the roof at locations noted on the drawings as per detail and Section 07 62 00 - Sheet Metal Flashing and Trim. Join flashing with S-lock on face and overlap horizontal joints 50 mm. Mitre and seal inside and outside corners of roof flanges. Seal all overlaps, apply sealant Type 'B' as metal flashing is being installed and clean off any material exposed to view. Avoid contact between caulking and bitumen products.
- .3 Install drip flashing true to line set on top of completed base sheet membrane roofing in continuous strip of Type 'A' sealant. Secure flashings with roofing nails installed in a double staggered row at 100 mm centres. Locate nails no closer than 75 mm from face.

- .4 Install an additional piece of base sheet (minimum 150 mm X 150 mm) centered over joints and corners of drip flashing and carried to within 25 mm of edge. Review procedures with the Consultant before proceeding.
- .5 Install 1-ply of base to 25 mm from drip edge and continuing a minimum of 150 mm beyond flashing flange. Ensure positive bond to all metal as to provide a continuous permanent watertight seal.
- .6 Install cap sheet as specified and trim flush with outside face with hot roofing knife. Work underlying surfaces with broom, roller or wet sponge as required to obtain a positive continuous permanent watertight seal.

3.20 ROOF DRAINS

- .1 Install self-adhered membrane air seal around drain and extend onto air/vapour barrier minimum 150 mm.
- .2 Unless otherwise specified or shown, provide prefabricated sump of sloped polyisocyanurate insulation 1200 mm each side of the centre of the drain. Reduce polyisocyanurate insulation thickness to minimum 19 mm at drain to provide positive roof drainage (make allowance for thickness of all flanges and clamps) and ensure water flow will not be impeded.
- .3 Complete roof membrane, installing additional 1 m x 1 m base sheet flashing centred over drain opening.
- .4 Fully coat drain flange to receive roofing with modified sealant and continue modified bitumen over flange. Neatly trim and work membrane to interior face and seal with Type 'A' sealant.
- .5 Set clamping ring in solid bed of Type 'A' sealant. Secure clamp ring and integral screen as dictated by drain design immediately after membrane is installed. Tighten bolts to ensure a permanent watertight compression seal.
- .6 Install and bolt strainers with heavy iron mechanical bracket to ensure the drain screen remains permanently in place to the Consultant's approval.
- .7 Install test plug, water test roof and repair leaks. Remove test plug once complete.
- .8 Restore interior finishes affected by work of this Contract to match original materials and finishes to Consultant's approval. Insulate rainwater leader pipes as required by Summary of Work in accordance with Section 22 05 11 – Plumbing and Drainage.

3.21 PLUMBING VENTS, B-VENTS, STACKS AND SLEEVES

- .1 Inspect and clean soil pipes of debris to ensure they are operational.
- .2 Protect exposed surface during roofing operation and clean surfaces free of bitumen before leaving site.

- .3 Make all penetrations air and watertight at air/vapour barrier by installing self-adhesive membrane flashings 150 mm onto air/vapour barrier and carry up and around projection. Clamp in place and caulk.
- .4 Trim base sheet at roof projections.
- .5 Adjust existing pipes to new flashing heights by either cutting down or extending pipes with matching materials attached with mechanical couplers. Ensure pipes are 38 mm higher than flashing to allow for sealing to prevent condensation.
- .6 Clear all projections free of contaminants and seal junction of base sheet and roof projections with trowel applications of sealant as shown on drawings.
- .7 Install all metal flanges to be built into the membrane before the installation of cap sheet. Insulate sleeves in accordance with drawings as specified. Where required, install telescoping caps to detail.
- .8 Prime topside and underside of all flanges to be incorporated with roofing prior to application. Use primer supplied by the membrane manufacturer. All primer to be dry before installation of membrane roofing or flashing.
- .9 Before installing flashings, install 1-ply base sheet extending to opening. Set flanges in bed of Type 'A' sealant prior to membrane installation, as per manufacturer's recommendations.
- .10 Install 1-ply of base sheet flashings thermofused to the flange to within 25 mm from upturn and continuing a minimum of 225 mm beyond flange. Continue cap sheet to metal upturn. Seal around upturn junction with sealant and touch up with matching granules, as per manufacturer's recommendations.
- .11 Install rain collars over sleeves and stacks as indicated to match adjoining materials and seal with sealant as indicated on drawings.

3.22 CONCRETE PAVERS

- .1 Install concrete pavers at the top and bottom of all roof access ladders accessing roof areas to be replaced in this contract.
- .2 Install concrete pavers at the exit of all roof access doors within the area of work.
- .3 Install concrete pavers at all locations indicated to receive rooftop walkways.
- .4 Set pavers on rubber protection pad, in turn on walkway membrane cap sheet.

3.23 LIQUID MEMBRANE FLASHING

- .1 Using a slow-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes before the addition of catalyst. Pour the resin into a second container if you make a batch mix. Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart. Add catalyst only to the amount of material that can be used within 10 to 15 minutes. Stir again for two minutes before applying.

- .2 Apply the first resin layer to the substrate using rollers, brushes or notched squeegees provided for this purpose. The thickness of the first layer must be 1.3 mm to 1.5 mm when wet.
- .3 Lay out the polyester reinforcement on the resin to prevent the formation of wrinkles, swellings or fishmouths.
- .4 Use rollers, brushes or notched squeegees in order to fully saturate resin reinforcement and remove wrinkles and air bubbles under the reinforcement. The appearance of the reinforcement should be slightly opaque without any white trace. It is important to correct these defaults before the resin cures.
- .5 Apply the second resin layer on top of the reinforcement using rollers, brushes or notched squeegees provided for this purpose. The second layer thickness must be 0.6 mm to 0.7 mm when wet.
- .6 Excess resin which is not absorbed should be used to saturate adjacent reinforcement.
- .7 The final resin coating should be smooth and even.
- .8 Each reinforcement shall overlap the previous one by 50 mm laterally and by 100 mm at the ends.

3.24 CLEAN UP

- .1 At all times, keep the premises free from accumulation of waste materials or rubbish. Stock piling of debris on the roof will not be permitted.
- .2 Repair defects in surface and bitumen runs with granules to match existing to leave the roof in an even consistent finish.
- .3 Leave roof clear of debris and bitumen left by spills and machine tracking.
- .4 Leave grounds and building free of debris and bitumen spread by pedestrian traffic where applicable.
- .5 Clean surfaces and penetrations of all contaminants and touch up to the satisfaction of the Owner. Include rooftop equipment, curbs, soil stacks, sleeves, gas lines, vents, drains and ladders.
- .6 Check drains to ensure they are functional and where required remove all debris.
- .7 At the completion of the work remove all rubbish, tools, equipment and surplus materials.
- .8 Be responsible to repair and pay all costs and fees required to rectify damage caused by work of the Contract with materials and finish to match original.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 The Aluminum Association Inc. (AAI)
 - .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
 - .2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A 240/A 240M-22, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A 606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .4 ASTM A 653/A 653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM A 792/A 792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .6 ASTM B 32-04, Standard Specification for Solder Metal.
 - .7 ASTM B 370-03, Standard Specification for Copper Sheet and Strip for Building Construction.
 - .8 ASTM D 523-89(1999), Standard Test Method for Specular Gloss.
 - .9 ASTM D 822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA): Roofing Specifications Manual 1997.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .2 CSA A123.22-08(2013), Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - .3 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.
 - .4 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .6 Canadian Roofing Contractors Association of North America (SMACNA)
 - .1 Architectural Sheet Metal Manual – 2012.

1.2 GENERAL

- .1 Install all sheet metal caps, counter flashes, and all other metal flashes required to complete roofing installation.
- .2 Form to profiles as detailed upon the drawings, or as required to suit site conditions.
- .3 Supply pre-formed metal fire stops for exterior wall cavities for installation by other trades.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to the Consultant a list of materials intended for use before they are ordered.
- .3 Submit manufacturer's printed product literature for sheet metal flashing fasteners and accessory materials. Include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Submit 50 x 50 mm samples of each type of sheet metal material, colour and finish in accordance with Section 01340 before proceeding with the work.
- .5 Submit samples if approval of substitutions is requested.
- .6 Submit copies of WHMIS 2015 SDS - Safety Data Sheets in accordance with Section 01 35 29 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.

1.4 COORDINATION

- .1 Coordinate work of this Section with Related Work specified in other Sections to ensure construction schedule is maintained and watertightness and protection of the building and finished work is maintained at all times.

1.5 EXAMINATION

- .1 Do not commence work until surface to be covered has been inspected.
- .2 Inspect work and advise the Consultant of conditions that would adversely affect the work of this trade.
- .3 Commencement of work is proof that the Contractor has accepted surfaces as satisfactory for intended operations and accepts responsibility for appearances and performance of completed work.
- .4 Repair damaged and inferior work caused by work of this Contract with materials and finish to match original to the Consultant's approval.

1.6 WORKMANSHIP

- .1 Sheet metal flashing work shall be carried out in accordance with the best standard practices; with joints locked, cleated, caulked as required and exposed edges hemmed. Ample allowance shall be made in all work for expansion and contraction.
- .2 Mitred corners shall be straight and true to profiles shown on drawings, with flat surfaces free of distortion and free of face nailing.

1.7 MOCK-UPS

- .1 Submit shop drawings and provide mock-up in accordance with Section 01 33 00 – Submittal Procedures. Before installing materials, provide a 1200 mm mock-up for each profile before fabrication. Cost of mock-up to be included in the Contractor's base bid.
- .2 Mock-up samples to indicate type, colour, size, method of joints, seam, expansion provisions,

stiffeners, cleat fasteners and method of sealing joints. Fit mock-up to each applicable roof profile or edge.

- .3 Review mock-up with drawings to ensure design intent can be achieved. Verify all elevations including those with matching materials and sections. Verify that continuity of air seals can be achieved. Verify attachments, methods for securing and strengths to ensure that work can support the anticipated loads and will remain in place against all wind, weather and service condition without warping or deforming.
- .4 Make adjustments to the work that results from a review of the mock-up without additional cost.
- .5 Acceptable mock-ups may be left in place as part of the final product.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage, and disposal of materials.
- .3 Manufacturer's recommendations for handling and storing products are to be considered a minimum requirement.
- .4 Materials shall be delivered to the site, undamaged and in their original packages, with manufacturer's labels visible, attesting to their conformity to specific standards.

1.9 WARRANTY

- .1 Remedy all defects in the Sheet Metal Flashings installed here under, which appear within a period of **two (2) years** from the date of substantial performance.
- .2 Make all necessary repairs and replacement within 48 hours of receipt of written notification.
- .3 Provide a written warranty confirming the above, issued on the corporate letterhead, and sealed by an authorized company official.
- .4 Nothing contained in this Article shall be construed as in any way restricting or limiting the liability in Common Law and statutory liability of the Contractor.

PART 2 - PRODUCTS

2.1 GENERAL

- .1 All standards, regulations and specifications listed herein are considered to be the latest available edition.
- .2 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly.

2.2 SHEET METAL MATERIALS

- .1 Sheet steel: 0.61 mm (24 gauge) minimum thickness, commercial quality to ASTM A526-80 with G90 designation zinc coating.
- .2 Where a metal flashing is in contact with dissimilar metal, use separation sheet or backpaint to suitable thickness to prevent electrolytic action.

2.3 PREFINISHED STEEL SHEET

- .1 Finish: factory applied coating to CGSB-93-GP-3M as follows:
 - .1 Class F1S, 8000 Series.Perspectra Plus Series- WeatherXL
 - .2 Colour: shall be selected by Architect from full range of Series 8000 colours to suit each location.
 - .3 Coating thickness: not less than 0.025 mm.
 - .4 Thickness specified for prefinished steel sheet applies to base metal.

2.4 SEALANTS

- .1 In accordance with Section 07 90 00, colour shall match colour of flashing, one component polyurethane (Allow for full selection of colours). Only sealants listed on CGSB Qualified Products List are acceptable for use on this project.

2.5 ACCESSORIES

- .1 Metal cleat: same material as metal flashings, 50 mm wide @ 600 mm c/c.
- .2 Continuous metal starter strip: 0.71 mm (24 ga.) galvanized steel, secured at 400 mm c/c.
- .3 Use galvanized, copper, aluminum or stainless steel nails or screws as most compatible with materials and preservatives being utilized.
- .4 Nails: Annular threaded nails of length to penetrate into bases minimum 25 mm.
No. 8 screws to penetrate wood 19 mm at 600 mm c/c.
- .5 Masonry fasteners: Tapcon, Permagrip or Tapgrip or Rawl. Spike sized to penetrate concrete 38 mm minimum as specified or shown.
- .6 Exposed fasteners: Where exposed fasteners are specified or as shown, use #10 screws with metal and neoprene washers pre-finished to match colour of flashing. Alternatively, use screws with colour match nylon caps where shown or approved by the Consultant.
- .7 Screws for starter strips and fascia: #8 @ 400 mm c/c.
- .8 Wedges: Rolled plumber sheet lead.
- .9 Sealant: Refer to Drawings and Section 07 92 00 – Joint Sealants.
- .10 Weather barrier membrane: Dry sheathing to CAN/CGSB-51.32, No. 15 perforated asphalt felt to CSA A123.3.
- .11 Self-adhered membrane: To Section 06 10 53, Miscellaneous Rough Carpentry.
- .12 Touch-up paint: As recommended by prefinished material manufacturer.

2.6 UNDERLAY / SEPARATION SHEET

- .1 No. 15 perforated asphalt felt to CSA A123.3-M1979.

2.7 FASTENERS

- .1 Of same material as sheet metal, galvanized flat head roofing nails to CSA B111-1974, of length and thickness suitable for metal flashing application.
- .2 Cadmium plated screws, colored head.

2.8 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint to CAN/CGSB-1.108-M89.
- .2 Touch-up paint: as recommended by pre-finished material manufacturer.
- .3 Purpose-made, ULC approved, fire stop sealant at cavity wall fire stops.
- .4 Plastic cement: to CAN/CGSB 37.5.
- .5 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

2.9 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable details, as indicated. Where not indicated, follow applicable CRCA 'FL' series details and SMACNA architectural details.
- .2 Metal shall be formed on a bending brake, shaping trimmed and hard seaming shall be done on bench, as far as practicable, with proper sheet metal working tools. Angles of bends and folds for interlocking metal shall be made with full regard to expansion and contraction to avoid buckling and to avoid damaging metal surfaces.
- .3 Fabricate all possible work in shop in maximum 2400 mm lengths by brake forming, bench cutting, drilling and shaping. Match existing profiles where metal flashing is to be repaired.
- .4 Hem exposed edges on underside 13 mm. Mitre and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Dry joints are to be tight but not dented so as to permit slight adjustments of sheets and yet remain watertight.
- .7 Lock seams at all corners.
- .8 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.
- .9 Supply all accessories required for installation of sheet metal work of this Section. Fabricate accessories of same material to which they will be used.

PART 3- EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

- .1 Metal flashing shall be as detailed, and supplemented by recommendations of S.M.A.C.C.N.A. Architectural Manual.
- .2 All free edges of metal flashing shall be strengthened by a fold at least 13 mm wide, set out slightly and presenting a straight line and neat finish. Form flashes in 2.4 m lengths, making allowance for expansion. When flashes exceed 600 mm in height form flashing in 1.2 m lengths.
- .3 Metal shall be formed on a bending brake, shaping trimmed and hard seaming shall be done on bench, as far as practicable, with proper sheet metal working tools. Angles of bends and folds for interlocking metal shall be made with full regard to expansion and contraction to avoid buckling or fullness in service and to avoid damaging surfaces of metal.
- .4 Dry joints are to be tight but not dented so as to permit slight adjustments of sheets and yet remain watertight.
- .5 Lock seams at all corners.
- .6 Provide all metal flashings and cap flashings to all roof top equipment and where any object passes through the roof. Refer to mechanical and electrical drawings as well as architectural drawings to determine extent of this work.
- .7 Use concealed fastenings except where approved before installation.
- .8 Install sheet metal flashings at copings, walls, expansion joints, roof openings and other components required to protect the membrane flashings as shown on the drawings or otherwise required. Where not indicated, follow applicable CRCA 'FL' series details.
- .9 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips.
- .10 Lock end joints and caulk with sealant.
- .11 Caulk flashing at reglet with sealant.
- .12 Install plastic pans around electrical conduits projecting through roof membrane. Fill pans with plastic cement.
- .13 Insert metal flashing into reglets as indicated to form weathertight junction.
- .14 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .15 Install continuous concealed starter strips at all exterior faces. Install cleats between lock joints and as indicated to permanently hold flashing in place. Install hook strip fasteners with 2 fasteners per cleat.
- .16 Sheet metal work shall be installed to cover the entire area it protects and shall be watertight under all service and weather conditions. Install in a uniform manner, true to line, free of dents,

- warping and distortion.
- .17 Back-paint sheet metal that comes into contact with another kind of metal, masonry or concrete with bituminous paint at the rate of 0.15 L/m^2 .
- .18 Install sheet metal with concealed fasteners at lock joints. Exposed fastening will only be permitted with the approval of the Consultant. When exposed fasteners are shown, space all fasteners evenly in an approved manner. Use lead plugs and screws with neoprene washers where fasteners are exposed, otherwise use concrete drive fasteners where metal flashings are installed over concrete masonry.
- .19 Install weather barrier membrane under sheet metal where indicated.
- .20 Self-Adhered Membrane:
- .1 Install 1-ply of self-adhered membrane to detail under sheet metal on horizontal or vertical surfaces that are not otherwise covered by membrane flashings.
 - .2 Ensure all surfaces to be covered with self-adhered membrane are complete and free of moisture and contaminants. At temperatures below 5°C (40°F) heat materials to be covered with hot air gun. Store all materials in heated storage above 5°C (40°F) and remove only as much material as can be used before cooling.
 - .3 Prime all surfaces to be covered with self-adhered membrane. Let primer tack dry and complete thumb test to ensure.
 - .4 Remove paper backing and install membrane true to line to completely cover the area intended to be protected to points shown on the drawing.
 - .5 Roll or work material into place by hand to ensure a positive bond.
 - .6 Membrane to be installed without air blisters and wrinkles. Rework, repair or replace all poorly installed membrane. Do not stretch material that would result in pull back and deformity of the membrane at intersections.
 - .7 Lap all side laps 75 mm and end laps 150 mm. Secure all membrane on vertical surface at points of termination at 150 mm c/c.
 - .8 Turn up membrane 150 mm at edge where horizontal surface meets vertical planes.
 - .9 Seal all points of termination at horizontal planes and vertical surfaces with modified sealant. Tool sealant to consistent smooth and even surface.
 - .10 It is recommended that all self-adhering membrane be installed by a team of two workmen. Avoid working in windy conditions or weather that would result in inferior product.
- .21 Join sheet metal by "S" lock seams, to permit thermal movement. Seal all fasteners and completely fill all joints with Type 'B' sealant as flashing is being installed. Clean off all excessive visible material subsequent to installation.
- .22 When flashing is being installed in more than one piece, offset joints in adjacent flashings by approximately 50%.
- .23 Form inside and outside corners by means of locked seams. Do not use pop rivets unless accepted by Consultant.
- .24 Slope all metal to interior of roof area to maintain slope, unless otherwise indicated. Do not form open joints or pockets that fail to drain water.
- .25 Where existing reglets are to be re-used, remove existing sealant and re-cut to conform to the size requirements specified herein.

3.3 ANCHORS

- .1 Space exposed fasteners evenly and in an organized pattern, keep number to a minimum. Where exposed to view, use metal fasteners of same material, colour, texture and finish.

3.4 COUNTER FLASHING

- .1 Install metal counter flashes as soon as possible after membrane flashings are in place and accepted by Consultant.
- .2 Counter flashing shall have crimped bottom edge, stiffening break and shall extend at least 450 mm up verticals and extend down verticals as detailed.
- .3 Where detailed, turn top edge of flashing into walls, secure with lead wedge or friction fit pins into reglet and caulk joint at wall.
- .4 Secure sections of metal in S-lock joints and allow for sufficient expansion and contraction between each piece.
- .5 Secure metal counter flashing a minimum of 300 mm above roof membrane. Use fasteners of sufficient length to penetrate at least 25 mm into substrate.

3.5 SEALANTS

- .1 Install caulking in accordance with manufacturer's recommendations and Section 07 90 00.
- .2 Provide foam backer rod for joints greater than 19 mm wide and 25 mm deep, prior to installing caulking compound.
- .3 Tool finish to satisfaction of Consultant.

3.6 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services: 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.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment. Remove and replace all sheet metal sections that received surface damage or scratches during fabrication, delivery or installation.
- .3 For scratches and scuffs to be retained in the new installation, use touch up paint recommended by the metal material supplier.
- .4 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS): Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC): ULC-S115-1995, Fire Tests of Fire stop Systems.

1.2 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.
- .4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction. Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

PART 2- PRODUCTS

2.1 MATERIALS

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
 - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN- ULC-S115 and not to exceed opening sizes for which they are intended.
 - .2 Fire stop system rating: Generally one (1hr) and two (2hr) hours. For assemblies noted on the OBC Matrix and drawings.
- .2 Service penetration assemblies: systems tested to CAN-ULC-S115 and listed in ULC Guide No. 40 U19.
- .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115 and listed in ULC Guide No. 40 U19.13 and ULC Guide No. 40 U19.15 under the Label Service of ULC. (Prefix SP)
- .4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

- .6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .9 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.
- .10 Sealants for vertical joints: non-sagging.
- .11 Approved Manufacturers: As listed in the ULC rated systems for each specified application.

2.2 FIRE RATED EXPANSION JOINT

- .1 The work shall consist of furnishing and installing waterproof, fire rated expansion joints in accordance with the details shown on the plans and the requirements of the specifications. Preformed sealant shall be silicone pre-coated, preformed, pre-compressed, self-expanding, sealant system.
- .2 Vertical and Horizontal Fire Rated Sealant System to be installed between new addition and the existing building.
- .3 Submittals:
 - .1 Standard Submittal Package – Submit typical expansion joint drawing(s) indicating pertinent dimensions, general construction, expansion joint opening dimensions and product information.
 - .2 All products must be identified by a ULc listing number and must be listed in the ULC Online Certification Directories as proof that they have been tested according to UL 2079 and manufactured under UL's "Follow Up" service.
 - .3 All products must be certified by independent laboratory test report to exceed the requirements of curtain wall performance tests ASTM E330, E283-04, and E331. Product must meet or exceed hurricane-force wind loading with no deflection at both positive and negative pressures up to 4954 Pascals - equal to 200 mph winds (ASTM E330-02-procedure A).
 - .4 All products must be certified by independent laboratory test report to ASTM E90-09 and to meet or exceed an STC 62 in STC 68 wall and OITC 52 rating in an OITC 52 wall.
 - .5 All products must be certified by independent laboratory test report to be free in composition of any waxes or wax compounds using FTIR and DSC testing.
 - .6 All products shall be certified in writing to be: a) capable of withstanding 150°F (65°C) for 3 hours while compressed down to the minimum of movement capability dimension of the basis-of-design product (-25% of nominal material size) without evidence of any bleeding of impregnation medium from the material; and b) that the same material after the heat stability test and after first being cooled to room temperature will subsequently self-expand to the maximum of movement capability dimension of the basis-of-design product (+25% of nominal material size) within 24 hours at room temperature 68°F (20°C).
- .4 Basis of Design:
 - .1 All joints shall be designed to meet the specified performance criteria of the project as manufactured by: (USA & International) EMSEAL JOINT SYSTEMS, LTD 25 Bridle Lane, Westborough, MA 01581-2603, Toll Free: 800-526-8365. (Canada) EMSEAL, LLC 120 Carrier Drive, Toronto, Ontario, Canada M9W 5R1 Toll Free: 800-526-8365.
 - .2 Alternate manufacturers must demonstrate that their products meet or exceed the design

- criteria and must submit certified performance test reports performed by nationally recognized independent laboratories as called for in section 1.02 Submittals. Submittal of alternates must be made three weeks prior to bid opening to allow proper evaluation time.
- .3 All product must meet ULc system no. JF132 (for vertical separations) and JF131 (for horizontal separations) for the WFR2 system.
- .5 Products:
- .1 Provide watertight, energy-efficient, 2 hour fire rated, exterior and interior joints in vertical-plane walls (above-grade). Typical locations include applications for interior wall joints where a 2 hour fire rating is required or desired. System shall perform waterproofing, fire-rating, movement-accommodation functions as well as contribute to thermal insulation and sound attenuation as the result of a single installation and without the addition of ancillary fire-blankets, mineral wool, coverplates, etc.
- .2 Provide EMSHIELD WFR2 as manufactured by EMSEAL JOINT SYSTEMS LTD and as indicated on drawings for vertical expansion joint locations.
- .3 Sealant shall be silicone pre-coated, preformed, pre-compressed, self-expanding, 2 hour-rated, sealant system. Sealant system shall be comprised of the following components:
- .1 fire-retardant-impregnated foam pre-coated on both sides with an intumescent fire-proofing material and pre-coated at the outer layers with waterproof silicone
- .2 field-applied epoxy adhesive primer,
- .3 field-injected silicone sealant bands
- .4 Material shall be capable of movements of +25%, -25% (50% total) of nominal material size. Standard sizes from 1/2" (25 mm) to 6" (250 mm). Depth of seal is 4" (100 mm) for WFR2.
- .5 Silicone external color facings to be low-modulus, waterproof silicone factory-applied to the foam while it is partially pre-compressed to a width greater than maximum joint extension and cured before final compression. When compressed to final supplied dimension, a bellow(s) to handle movement must be created in the silicone coating. Silicone coatings to be available in a range of not less than 26 standard colors for coordination with typical building materials. Separate colors may be chosen for each coated surface.
- .6 Select the sealant system model appropriate to the movement and design requirements at each joint location that meet the project specification or as defined by the structural engineer of record.
- .6 Fabrication:
- .1 EMSHIELD WFR2 by EMSEAL JOINT SYSTEMS LTD must be supplied precompressed to less than the joint size, packaged in shrink-wrapped lengths (sticks).
- .2 Directional changes and terminations into horizontal plane surfaces to be provided by factory-manufactured universal-90-degree single units containing minimum 12-inch long leg and 6-inch long leg or custom leg on each side of the direction change or through field fabrication in strict accordance with published installation instructions.
- .7 Installation:
- .1 The General contractor shall provide properly formed and prepared expansion joint openings constructed to the exact dimensions and elevations shown on the contract drawings. Deviations from these dimensions will not be allowed without the written consent of the engineer of record.
- .2 The contractor shall clean the joint opening of all contaminants immediately prior to installation of expansion joint system. Repair spalled, irregular or unsound joint surfaces using accepted industry practices for repair of the substrates in question. Remove protruding roughness to ensure joint sides are smooth. Ensure that there is sufficient depth to receive the full depth of the size of the EMSHIELD WFR2 / EMSHIELD WFR3 being installed plus at least 1/4-inch (6mm) for the application of corner beads. Refer to

- .3 Manufacturers Installation Guide for detailed step-by-step instructions.
No drilling, or screwing, or fasteners of any type are permitted to anchor the sealant system into the substrate.

2.3 EXPANSION JOINT COVER

- .1 For 50mm and 75mm joints, supply Aluminum Expansion Joint Covers. Provide Models ASM 200 and ASM 300 (depending on the application), as manufactured by C/S Construction Specialties, and distributed by C/S Canada, 895 Lakefront Promenade, Mississauga, Ontario, L5E 2C2, T. (888) 895-8955.
- .2 Material:
 - .1 Extrusion – C/S uses multiple alloys & tempers which are established to be the most appropriate for the given use of individual parts. Will be one of the following:(6063-T5, T6, T52) (6061-T5, T6, T51) (6105-T5, T6) (6005-T5) (6005A-T5, T6).
 - .2 Duroflex Gasket: Single Durometer – 80 Shore A, ASTM D2000; Colour Gray.
- .3 Finish: Clear Anodized Finish.
- .4 Install anchor clips with the anchor bolts as supplied by C/S. The cover plate engages a “J-Hook” and locking channel for attachment. For complete installation instructions contact manufacturer.

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 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 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.
- .2 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.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.

- .5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by Consultant.
- .2 Install floor fire stopping before interior partition erections.
- .3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Mechanical pipe insulation: certified fire stop system component. 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 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.
 - .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.

3.6 SCHEDULE

- .1 Firestop and/or smoke seal at:
 - .1 All penetrations through masonry, concrete, and gypsum board partitions and walls that form part of a "rated" or "unrated" fire separation.
 - .2 Between roof deck at all walls and underside that form part of a "rated" or "unrated" fire separation.
 - .3 Edge of floor slabs at curtain wall and precast concrete panels.
 - .4 Top of fire-resistance rated masonry and gypsum board partitions.
 - .5 Intersection of fire-resistance rated masonry and gypsum board partitions that form part of a fire separation or "unrated" fire separation.
 - .6 Control and sway joints in masonry and gypsum board partitions and walls that form part of a "rated" or "unrated" fire separation.
 - .7 Penetrations through fire-resistance rated floor slabs, ceilings and roofs
 - .8 Openings and sleeves installed for future use through a "rated" or "unrated" fire separation.
 - .9 Around mechanical and electrical assemblies penetrating a "rated" or "unrated" fire separation.
 - .10 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 a "rated" or "unrated" fire separation.
 - .11 Other areas as shown on drawings.

3.7 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

- .3 Protect the system and its components during construction. Subsequent damage to the expansion joint system will be repaired at the general contractor's expense. After work is complete, clean exposed surfaces with a suitable cleaner that will not harm or attack the finish.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 ASTM International: ASTM C 919-08, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS): Material Safety Data Sheets (MSDS).
- .4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards: SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .5 General Services Administration (GSA) - Federal Specifications (FS)
 - .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit 2 samples of each type of material and colour. Cured samples of exposed sealants for each colour where required to match adjacent material.
- .3 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 acceptable to Labour Canada.
- .4 Manufacturer's Instructions: Submit instructions to include installation instructions for each product used. Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .5 Manufacturer's product to describe:
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into

manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Proceed with installation of joint sealants only when:
 - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
 - .2 Joint substrates are dry.
 - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions: Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions: Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 WARRANTY

- .1 Repair or replace any caulking that runs, cracks or otherwise shows sign of failure within five (5) years from the date of the Certificate of Substantial Performance.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

- .1 General:
 - .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
 - .2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
 - .3 Where sealants are qualified with primers use only these primers.
- .2 Primers: type recommended by sealant manufacturer for specific substrate adhesion.
- .3 Joint Fillers:
 - .1 General: compatible with primers and sealants, oversized 30 to 50%.

- .2 Joint backing rod: round, non-gassing, polyurethane foam, closed-cell polyethylene, non-bleeding neoprene or butyl rod. Installed under the manufacturer's recommended compression. Note: joint backing and adjoining substrates must be thoroughly dry.
- .3 Polyurethane and/or polyethylene: to shore A hardness 20, tensile strength 140 kPa to 200 kPa.
- .4 Neoprene or butyl rubber: to shore A hardness 70.
- .5 Caution: do not install more joint backing than can be sealed the same day.
- .4 Bond Breakers:
 - .1 Adhesive backed, pressure sensitive, polyethylene or PVC bond breaker tape to prevent three-sided adhesion and which will not bond to sealants.
 - .2 Acceptable Products: 470 tape or 481 tape by 3M.
- .5 Sealants:
 - .1 For Exterior Application:
 - .1 Use three component, chemically curing, epoxidized polyurethane terpolymer sealant to CAN/CGSB 19.24-M90, Type II.
 - .2 Acceptable Material: Dymeric epoxidized polyurethane sealant as manufactured by Tremco Incorporated.
 - .2 For Interior Application:
 - .1 One part acrylic to CGSB 19-GP-5M Tremco Acrylic 555.
- .6 Colour of Sealants:
 - .1 To be selected from Tremco Standard "Colour-Paks".
 - .2 Aluminum windows/doors (exterior) - to be selected later by the Architect. Allow for four (4) different colours.
 - .3 Aluminum windows/doors (interior) - to match interior paint colour.
 - .4 Steel doors (interior and exterior) - to match colour of door frame.
 - .5 Brick control joints - to match colour of adjacent brick.
- .7 Compressable Seal: permanently elastic, precompressed, latex modified asphalt-impregnated, high density open celled polyurethane foam strip. Size as recommended by manufacturer for joint to be sealed. Degree of compression: 25%
 - .1 Acceptable material: Emseal expanding foam sealant as manufactured by Emseal Corporation.
- .8 Joint Cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Modified bitumen sealant (Sealant Type 'A'):
 - .1 For penetration and terminations of bituminous and modified bituminous membrane: To CAN/CGSB-37.5. As recommended by membrane manufacturer.
 - .2 Standard of acceptance:
 - .1 Sopramastic 200 by Soprema.
 - .2 Aquabarrier Mastic by IKO.
 - .3 Polybitume 570-05 by Henry.
 - .4 Or accepted alternate.
- .2 Silicones one part (Sealant Type 'B'):
 - .1 To CAN/CGSB-19.13 and ASTM C920, Type S, Grade NS, Class 35, colour to match surfaces.
 - .2 Standard of acceptance:
 - .1 Tremcill 400 by Tremco.

- .2 Dowsil CWS by Dow.
 - .3 Or accepted alternate.
- .3 High temperature sealant (Sealant Type 'C'):
 - .1 One component, low modulus, gun grade, non-sag, moisture-cure polyurethane sealant with UV resistance, designed to cure into a fire rated, elastic weatherproof seal. Sealant shall comply with AS1530 Part 4-1997 (Fire Resistance Test of Elements of Building Construction) and AS4072 Part 1-1992 (Service penetrations and control joints). Tested by BRANZ.
 - .2 Standard of acceptance:
 - .1 Dow Corning 736 Silicone.
 - .2 Or accepted alternate.

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 joint sealants installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants (depth ratio 1/2 of joint width with minimum width and depth of 6 mm, maximum width 25 mm).
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 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.
- .4 Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.
- .5 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.
- .6 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.
- .7 Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.
- .8 Install joint filler to achieve correct joint depth, with approximately 30% compression.
- .9 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .10 Apply bond breaker tape where required to manufacturer's instructions.
- .11 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.
- .12 Ensure joint surfaces are dry and frost free.

- .13 Prepare surfaces in accordance with manufacturer's directions.

3.3 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.4 APPLICATION

- .1 Sealant:
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle. Apply sealants, primers, joint fillers, compressible seal, and bond breakers as indicated to manufacturer's instructions. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Install sealant Type 'B' at exterior perimeter or window and door frames.
- .4 Install sealant Type 'C' at all B-vent collars and at all high temperature locations.

3.5 EXTENT OF CAULKING

- .1 Provide caulking in all locations as shown on drawings and where noted below.
- .2 Provide caulking at the perimeter of all door and window frames, glazed metal screens, and at window flashings where they abut adjacent materials.
- .3 Provide caulking where countertops and countertop splashbacks butt against vertical surfaces.
- .4 Caulk at all interior and exterior masonry control and expansion joints.
- .5 Perimeters of exterior openings where frames meet exterior facade of building (i.e. brick, block, precast masonry).
- .6 Coping joints and coping-to facade joints.
- .7 Exterior joints in horizontal wearing surfaces.
- .8 Seal interior perimeters of exterior openings.
- .9 Perimeters of interior frames.
- .10 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls).

- .11 Joints at tops of non-load bearing masonry walls at the underside of poured concrete.
- .12 Exposed interior control joints in drywall.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day.
 - .1 Clean adjacent surfaces immediately.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 653/A 653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B 29-03, Standard Specification for Refined Lead.
 - .3 ASTM B 749-03, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2000.
 - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.
- .5 National Fire Protection Association (NFPA)
 - .1 NFPA 80-99, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252-03, Standard Methods of Fire Tests of Door Assemblies.
- .6 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-04, Architectural Coatings.
 - .2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .7 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .4 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.
 - .5 CAN4-S105-M85, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.2 SYSTEM DESCRIPTION

- .1 Design Requirements:
 - .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.
 - .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
 - .3 Frames and screens required to provide fire-resistance ratings or a non-rated fire separation shall be designed to meet requirement of The Building Code and NFPA 80
 - .4 Steel fire rated doors and frames: labelled and listed by an organization accredited by

Standards Council of Canada in conformance with, CAN4-S104 and NFPA 252 for ratings specified or indicated.

- .5 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, NFPA 252 and listed by nationally recognized agency having factory inspection services.
- .6 Design shall be based on limited states design principles using factored loads and resistances.
- .7 In addition to information identified in the Door Schedule, refer also to Drawings for required fire separation and provide rating of frames accordingly. In the event of discrepancies, the more stringent requirement will govern

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer licensed in Province of Ontario.
 - .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvred, arrangement of hardware and fire rating and finishes.
 - .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing, fire rating, finishes.
 - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
 - .5 Submit test and engineering data, and installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.5 WARRANTY

- .1 Doors and frames shall be warranted against manufacturing defects for a period of **three (3) years** from the date of Substantial Performance. Where defects occur, the contractor shall be responsible for all costs, including painting, hanging and installing hardware, associated with replacing the defective doors.

1.6 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Steel fire rated doors and frames, labelled and listed by an organization accredited by standards Council of Canada in conformance with CAN4-S104M NFPA 252 for ratings specified or indicated.
- .2 Provide fire labelled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104, ASTM E 152 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Fire Rated Doors, Frames and Screens:
 - .1 Door and frame assembly: material and construction approved by ULC. Door: sheet steel, 1.3 mm (18 gauge) minimum base thickness. Frame: sheet steel, 1.6 mm (16 gauge) minimum base thickness.
 - .2 Frames for glazed screens: shall be constructed to Ontario Building Code Section 3.1.8.14.2 Door cores: vertically stiffened with steel ribs and all voids filled with semi-rigid fibrous insulation minimum density 24 kg/m³, unless indicated otherwise on Door Schedule.
 - .3 Temperature rise limits for doors: for all doors listed within Door Schedule with temperature rise restrictions, the maximum temperature rise on the opaque portion of a door shall not exceed 250⁰ C after one hour when tested in accordance with CAN4-S104M "Standard Method for Fire Tests of Door Assemblies".
 - .4 Glazing stops: commercial grade sheet steel of thickness and design approved by ULC.
 - .5 Anchors for installation in concrete walls: tube and anchor (recessed head). All components and design approved by ULC.
 - .6 Anchors for installation in metal stud walls: "Z" steel anchors, thickness and design approved by ULC.
- .2 Hollow Metal Doors:
 - .1 Sheet steel: 1.2 mm base thickness, commercial grade, zinc coated steel to ASTM A653:
 - .1 Provide a Z275 zinc coating to ASTM A446 for exterior doors.
 - .2 Provide a W25 (wiped) zinc finish to ASTM A653 for interior doors.
 - .2 Glazing stops: minimum 1.2 mm base thickness sheet steel, tamperproof, screw fixed:
 - .1 Provide a Z275 zinc coating to ASTM A446 for exterior doors.
 - .2 Provide a W25 (wiped) zinc finish to ASTM A653 for interior doors
 - .3 Door Core: unless indicated on Door Schedule, all doors be steel stiffened with 5 ribs, welded to both faces and insulated with semi-rigid fibrous insulation with a minimum density of 24 kg/m³
- .3 Hollow Metal Frames and Screens:
 - .1 Sheet steel: commercial grade, zinc coated steel to ASTM A653
 - .1 Frames: 1.6 mm (16 gauge) base thickness, steel
 - .2 Provide a Z275 zinc coating to ASTM A446 for exterior frames
 - .3 Provide a W25 (wiped) zinc finish to ASTM A653 for interior frames
 - .2 Glazing stops: minimum 1.2 mm base thickness sheet steel, tamperproof, screw fixed:
 - .1 Provide a Z275 zinc coating to ASTM A446 for exterior frames
 - .2 Provide a W25 (wiped) zinc finish to ASTM A653 for interior frames
 - .3 Reinforcing channel: to CAN/CSA G40-21-M1978, Type 300W
 - .4 Door bumpers: black neoprene double stud
- .4 General:
 - .1 Frame floor anchors and channel spreaders: minimum 1.6 mm thick base steel
 - .2 Guard boxes: minimum 0.8 mm thick base steel
 - .3 Hardware, strike, etc., reinforcing: minimum 3.5 mm thick base steel unless indicated otherwise. Hinge reinforcing: minimum 6.4 mm thick base steel.
 - .4 Primer: to CGSB 1-GP-181M.
 - .5 Insulate exterior doors and frames components with polyurethane insulation.

2.2 FABRICATION

- .1 Fabricate doors and frames as detailed, to Canadian Steel Door and Frame Manufacturers' Association, (CSDFMA) Canadian Manufacturing Specifications for Steel Doors and Frames, latest edition; except where specified otherwise. Reinforce door and frames to suit hardware requirements specified in Section 08 71 00 - Door Hardware.
- .2 Fit and assemble work in shop where possible. Execute according to details and reviewed shop drawings. Where shop fabrication is not possible make trial assembly in shop.
- .3 Welding shall conform to requirements of CSA W-59-R2001, and shall be performed by a fabricator fully approved by the Canadian Welding Bureau. Fill or grind exposed welds to a smooth and flush finish. Exposed welds shall be continuous.
- .4 Joints and intersecting members shall be accurately fitted, made in true planes with adequate fastenings.
- .5 Insulate to prevent contact between different metals and metal-to-masonry or concrete to obviate chemical or electrolytic corrosion.
- .6 Fabricate work square, plumb, straight, true and accurately fitted. Provide adequate reinforcing and anchorage.
- .7 Bond treat and shop prime with a rust inhibitive zinc chromate primer on all parts not specified to have zinc coating.
- .8 Exterior doors and frames shall be thermally broken.

2.3 HOLLOW STEEL FRAMES AND SCREENS

- .1 Provide hollow steel frames and screens for openings as indicated.
- .2 Form frames and screens to profiles indicated of minimum 1.6 mm (16 gauge) hot rolled steel. Minimum zinc coating shall be in accordance with CSA G 164-M1981 (See Table 1 for minimum mass of zinc coating), and applied to frames and screens. Where indicated, frames for glazed screens shall be fabricated in compliance with Building Code Section 3.1.8.14.2. Refer to Door Schedule.
- .3 Accurately cut mitres, weld corners continuously along inside frame profile. Grind welded corners to a smooth and flush finish. Fill corners of steel frames with metallic paste filler and sand to a smooth and uniform finish.
- .4 Prepare frames for hardware as called for on the hardware schedule. Blank, reinforce for butts with minimum 6.4 mm steel plate. Drill and tap as required. Reinforce both sides of door frames for door closers and for hardware attachment in accordance with the approved hardware schedule.
- .5 Cut mitres and joints accurately and weld continuously on inside of frame profile.
- .6 Grind welded corners and joints to flat plane, fill with metallic paste filler and sand to uniform smooth finish.
- .7 Provide two (2) readily removable or concealed in floor type channel or angle spreaders. Finish shall be as in frames.
- .8 Provide three (3) rubber bumpers in each jamb on strike side.

- .9 Frames and screens shall be provided with engineered mullion extensions. Such mullion extensions shall be fully concealed in drywall partitions, and shall extend to the underside of the structure above. Provide bracing above the ceiling as required.
- .10 Screens shall be anchored to the floor at 600 mm on centre. Anchor screen reinforcing firmly to structure.
- .11 Provide removable glazing stops of formed steel complete with countersunk Phillips head screws.
- .12 Frame extrusions and hollow steel sections shown on Door Schedule shall meet ULC, and/or Building Code requirements. Certification of test performance in accordance with ASTM E90-617 or E90-66T shall be provided.
- .13 For locations of frames installed in drywall refer to drawings and Door Schedule.

2.4 HOLLOW STEEL DOORS

- .1 Provide hollow metal doors of types and sizes noted on Door Schedule and shown on drawings.
- .2 Doors shall be flush, 44 mm thick, of 1.3 mm Steel (18-gauge) cold rolled, stretcher levelled, sheet steel.
- .3 Unless noted otherwise, interior doors shall have 1.6 mm (16 gauge) stiffeners at maximum 150 mm o.c., with all voids filled with the specified insulation. Where required, prepare doors to accept weatherstripping, gaskets and such accessories.
- .4 Doors shall be mortised, reinforced, drilled, and tapped to receive template hardware. Reinforce for surface mounted hardware.
- .5 Weld door components together by means of arc welding in accordance with CSA W-59-MR2001 to provide integrated units, square, true, and free from distortion or waves.
- .6 Clean, sand, flood coat with air drying paste filler, and again clean, and sand flush to eliminate all unevenness or irregularities.
- .7 Glazed doors shall be provided with glazing stops of formed steel complete with countersunk Phillips head screws.
- .8 Door style edges at openings shall be closed and reinforced. Caps with exposed laps onto door faces are not permitted.
- .9 The maximum free clearance below doors in the closed position shall be 6 mm.
- .10 At double doors the clearance between leaves shall be a maximum of 2 mm when they are in the fully closed position.
- .11 All exterior doors and also interior doors with electronic contacts shall have a top flush steel closure with edges welded and seam filled.

2.5 FIRE RATED STEEL DOORS AND FRAMES

- .1 In all instances fire rated steel doors and frames shall bear an appropriate Underwriters'

Laboratories of Canada label for the rating required.

2.6 FRAME ANCHORAGE

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm on centre maximum.

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 INSTALLATION GENERAL

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

3.3 FRAME INSTALLATION

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air barrier and vapour retarder.

3.4 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
 - .1 Hinge side: 1.0 mm.

- .2 Latchside and head: 1.5 mm.
- .3 Finished floor, top of carpet, noncombustible sill, and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvers as shown on mechanical drawings.

3.5 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.6 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.
- .2 Install Fire-rated glass in all fire rated frames and screens.

END OF SECTION

PART 1- GENERAL

1.1 RELATED SECTIONS

- .1 Section 07 92 00 – Joint Sealing.

1.2 REFERENCES

- .1 ASHRAE/IES 90.1-1989
- .2 ANSI/ASHRAE/USGBC/IES 189.1-2009
- .3 American Architectural Manufacturers Association (AAMA): AAMA 609/610-09, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
- .4 ASTM International : ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .5 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.40-97, Anticorrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
 - .3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
- .6 CSA International
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 Ontario Building Code, SB-10
- .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards: SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 SYSTEM DESCRIPTION

- .1 Design Criteria
 - .1 Design frames and doors in exterior walls to:
 - .1 Accommodate expansion and contraction within service temperature range of -35 to 35 degrees C.
 - .2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E 330 under wind load of 1.2 kpa submit certificate of tests performed.
 - .3 Movement within system.
 - .4 Movement between system and perimeter framing components or substrate.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate materials and profiles and provide full-size, scaled details of components for door and frame. Indicate:
 - .1 Interior trim and exterior junctions with adjacent construction.
 - .2 Junctions between combination units.
 - .3 Elevations of units.
 - .4 Core thicknesses of components.

- .5 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.
- .6 Location of caulking.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Use coatings that are easy to remove and residue free.
 - .2 Leave protective covering in place until final cleaning of building.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect aluminum doors and frames from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Protection:
 - .1 During construction protect aluminum members and glass against damage from plaster, mortar, and any other cause.
 - .2 Protect prefinished aluminum surfaces with protective coatings or wrappings, until the installation of glazing commences. Ensure that method of protection does not damage finish.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in MANAGEMENT AND accordance with Section 01 74 19 -DISPOSAL Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of corrugated cardboard polystyrene plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Aluminum extrusions: to Aluminum Association alloy AA 6063-T5 anodizing quality.
- .2 Sheet aluminum: Aluminum Association alloy AA 1100-H14 anodizing quality.
- .3 Fasteners: finished to match adjacent material.
- .4 Door bumpers: black neoprene.
- .5 Isolation coating: bituminous paint.

- .6 Glazing materials: Section 08 80 50
- .7 Sealants: Section 07 92 10

2.2 ALUMINUM DOORS

- .1 Acceptable Products
 - .1 Prevost, Series 2250 with optional 166 mm (6 1/2") bottom rail and 102 mm (4") midrail.
 - .2 Alumicor, Canadiana Insuldoor 400A with optional 104.8 mm (4 1/8") midrail and a 143mm (5 5/8") top rail.
 - .3 Kawneer, Insulclad 360 with a 100mm (4") midrail and a 127mm (5") top rail.
- .2 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.
- .3 Provide thermally broken doors for exterior.
- .4 Hardware:
 - .1 Threshold: 178 mm wide (exterior door). Ensure threshold heights meet accessibility of no more than 12mm from surfaces.
 - .2 Hinges: roton 780-224 HD.
 - .3 Plated steel butt back-up plates 4.7 mm thick x 254 mm long, heavy duty.
 - .4 Exit device: Sargent 16-8504-98-K-PTB with keyed cylinder for DOG down.
 - .5 Closer: LCN 4041 PA-CUSH.
 - .6 Stabilizing security blocks from door to frame.
 - .7 Pull Handle: GSH 1180-2.
 - .8 Door sweep and weather stripping as recommended by the manufacturer.
 - .9 Best cylinder for panic hardware & exterior to accommodate 7 pin cores. Owner to supply cores.
- .5 Insulated Panels: Solid lower panel consisting of .80 aluminum sheet each side or 3/4" plywood core. Finish to match door and frame.

2.3 ALUMINUM FRAMES

- .1 Exterior entrance, 115mm clear anodized thermally broken.

2.4 ALUMINUM FINISHES

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
 - .1 Clear anodic finish: designation AA-M10C22A31.
- .2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, and Protective and Decorative.

2.5 STEEL FINISHES

- .1 Finish steel clips and reinforcing steel with steel primer to CGSB 1.40 zinc coating to CSA G164.

2.6 FABRICATION

- .1 Doors and framing to be by same manufacturer.
- .2 Fabricate doors and frames to profiles and maximum face sizes as indicated. Provide minimum 22 mm bite for insulating glazed units.
- .3 Provide structural steel reinforcement as required.
- .4 Fit joints tightly and secure mechanically.
- .5 Conceal fastenings.
- .6 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates provided under Section 08 71 00 - Door Hardware.
- .7 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

PART 3- EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets

3.2 INSTALLATION

- .1 Set frames plumb, square, level at correct elevation in alignment with adjacent work.
- .2 Anchor securely.
- .3 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.
- .4 Adjust door components to ensure smooth operation.
- .5 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

3.3 GLAZING

- .1 Glaze aluminum doors and frames in accordance with Section 08 80 50 – Glazing.

3.4 CAULKING

- .1 Apply sealant in accordance with Section 07 92 10 – Joint Sealing.

3.5 CLEANING

- .1 Perform cleaning of aluminum components in accordance with AAMA 609.1 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

- .2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .3 Clean aluminum with damp rag and approved non-abrasive cleaner.
- .4 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames.
- .5 Clean glass and glazing materials with approved non-abrasive cleaner.
- .6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Work included: Furnishing and installing factory fabricated and finished electro- mechanical swinging operator.
- .2 Provide all associated electrical and hardware requirements to this section.

1.2 REFERENCES

- .1 Aluminum Association (AA): AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA): AAMA 701/702-04, Voluntary Specifications for Pile Weather Stripping and Replaceable Fenestration Weatherseals.
- .3 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association:
 - .1 ANSI/BHMA A156.1-2006, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.3-2001, Exit Devices.
 - .3 ANSI/BHMA A156.4-2008, Door Controls - Closers.
 - .4 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
 - .5 ANSI/BHMA A156.10-2005, Power Operated Pedestrian Doors.
 - .6 ANSI/BHMA A156.19-2007, Power Assist and Low Energy Power Operated Doors.
- .4 ASTM International
 - .1 ASTM A 167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - .2 ASTM B 209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .3 ASTM B 221M-07, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - .4 ASTM D 2000-08, Classification System for Rubber Products in Automotive Applications.
 - .5 ASTM D 2287-96(R2010), Standard Specification for Non Rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
 - .6 ASTM E 283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .7 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .8 ASTM E 331-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 - .9 ASTM E 547-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.
- .5 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.132M-90, Zinc Chromate Primer, Low Moisture Sensitivity.
 - .2 CAN/CGSB 1.181-99, Ready-Mixed, Organic Zinc-Rich Coatings.
- .6 CSA International
 - .1 CAN/CSA-A440-00, Windows /Special Publication A440.1-00(R2005), User Selection Guide to CSA Standard CAN/CSA-A440-00, Windows.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 National Research Council of Canada (NRC)
 - .1 MNECB-97, Model National Energy Code of Canada for Buildings.

- .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .9 Underwriters' Laboratories of Canada (ULC)
 - .1 ULC/ORD C305-72, Panic Hardware.
 - .2 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
 - .3 CAN/ULC-S533-08, Egress Door Securing and Releasing Devices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for doors, hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate layout, dimensions, elevations, detail sections of members and sill conditions, materials, finishes, recesses, hardware including mounting heights, anchors and reinforcements, provisions for expansion and contraction, methods of joining sheet metal and joint locations, glass types and glass thicknesses, glazing details, types of sealants, details of other pertinent components of the work, and adjacent construction to which work of this section is attached.
 - .2 Identify installation tolerances required, assembly conditions, routing of service lines, locations of operating components, controls and boxes.
 - .3 Indicate door signs.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Maintenance Contract: Supply complete service and maintenance of operating equipment for 1 (one) year from date of substantial performance of the work.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply wrenches and tools required for maintenance of equipment.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Conform to applicable code for automatic release of control drive unit to permit manual operation of emergency exit doors.
 - .2 Conform to applicable code for release of automatic locks to permit manual operation of emergency exit doors and to CAN/ULC-S524 where required to be integrated with building's fire alarm system.
- .2 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 CERTIFICATION REQUIREMENTS

- .1 Swinging door operator shall be CERTIFIED by the manufacturer to meet performance design criteria according to the following test standards:
 - .1 Underwriter's Laboratories (UL) listed to UL325.
 - .2 UL Listed Fire Door Operator
 - .3 cUL Listed – CSA22.2 No. 247 (equivalent to CSA certified).
- .2 Automatic Swinging Door Operator: Shall be manufactured in an ISO 9001 registered manufacturing facility.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect automatic entrance doors and frames from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Cover exposed metal surfaces with pressure sensitive heavy protection paper or strippable plastic coating.
 - .1 Use materials of type which will not leave residue or become bonded when exposed to sun.
 - .2 Use padded blankets or approved protective wrapping for decorative metal work and similarly finished exposed elements.

1.9 SITE CONDITIONS

- .1 Verify that other trades are complete before installing the automatic swinging door operator.
- .2 Mounting surfaces shall be plumb, straight and secure; substrates shall be of proper dimension and material.
- .3 Refer to the construction documents, shop drawings and manufacturer's installation instructions.
- .4 Coordinate installation with the glass, glazing and hardware installation.
- .5 Observe all appropriate OSHA safety guidelines for this work.

1.10 WARRANTY

- .1 Contractor hereby warrants that automatic doors will function as specified for period of 5 (five) years from date of substantial performance.
- .2 Warranty: include coverage of repair or replacement of components or entire units which fail in materials workmanship. Failures include but are not necessarily limited to, structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation of operators speed control and hardware, deterioration of metals, metal finishes, and other materials beyond normal weathering.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- .1 Stanley Access Technologies.

2.2 AUTOMATIC DOOR SYSTEM

- .1 Swinging Door Operator: Shall be Stanley Magic-Force Swinging Door Operator-Visible application-Low Energy. The system shall consist of electro-mechanical swinging door operator and electrical controls, aluminum header, connecting hardware, actuating controls, guide rails (optional), and on/off/hold open switch. All components shall be factory assembled, adjusted and tested. NO ALTERNATES.
- .2 Power Open Operation: The operator shall open the door with a 3/16 HP, DC motor through a high torque reduction gear system, cut spiral beveled gear set welded to a toothed drive shaft, and linkage. The drive system shall have positive, constant engagement. A cam and roller mechanism shall provide for a non-back-lash positive open and close positioning. The operator shall stop the door in the open position by electrically reducing the motor voltage and stalling against a field adjustable 80 to 135 degree position stop.
- .3 Full Energy / Low Energy Selectable: The microprocessor control shall be easily field adjustable to comply with ANSI A156 – Full Energy or ANSI A156.19 – Low Energy Code requirements. Field adjustments for door-opening speed, door-opening force, door-closing speed, door-closing force shall be provided without the requirement for additional components. The system shall have the ability to be converted from Low Energy to Full Energy with simple field modifications and addition of Safety Sensors as outlined in ANSI A156.10.
- .4 Non-Handed Operation: The operator shall have the ability to be converted from right hand to left hand operation with simple field modifications.
- .5 Serviceability: To reduce on site spare parts requirements, the operator shall be designed to accommodate right hand, left hand, in-swing, out-swing, visible, concealed, low energy, and full energy applications with minimal field modifications/parts.
- .6 Field Adjustable Compression Spring Closing Operation: The operator shall close the door by spring energy. Employing the motor, as a dynamic brake shall aide-closing speed. The closing spring shall be a helical compression spring, adjustable for positive closing action at a low material stress level for long spring life. The helical compression spring shall be easily adjustable to accommodate a wide range of field conditions.
- .7 Independent Adjustable Closing and Latching Speed Control: The operator shall employ a rheostat module to allow for easy, independent field adjustment of closing and latching speeds using the motor as a dynamic brake.
- .8 Field Adjustable Open Stop: The operator shall provide a non-handed, easily field adjustable open stop to accommodate opening angles from 80 to 135 degrees without the need for additional components.
- .9 Consistent Cycle: Utilizing a cam and roller mechanical design profile, the operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open. Additionally, the range of the force shall be easily field adjustable to accommodate a wide range of on-site conditions.
- .10 Controlled Motion: The operator shall be designed to provide a positive position for full open and a positive position for full closed.

- .11 Split Force Path: The operator shall be designed such that abusive forces deployed to the door shall directly bypass the motor and gear train assembly and be delivered directly to the compression spring via actuator rods and a profile cam, thereby extending the life of the system.
- .12 Quiet Performance: The operator shall be designed to output audible noise ratios less than or equal to 50dba.
- .13 Field Removable Motor: The operator shall be designed to allow for motor removal and replacement in the field with simple tools and without the need for operator removal from the header assembly.
- .14 Auxiliary Switch: The operator shall incorporate an auxiliary switch allowing for monitoring of door position.
- .15 Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power. A cam and roller mechanism shall allow the operator to deliver an even, consistent open force across the entire transition from door fully closed to door fully open.
- .16 Emergency Release: For center pivot door(s)-normal in swing, the operator shall have a built-in emergency release with controlled spring return to the closed position without manual resetting. While the door is in the emergency release mode, a disconnect switch shall prevent powered operation. No header or jamb mounted stops or cams shall be required for emergency function. Not more than 50 pounds at the lock stile shall be required for emergency use per ANSI A157.10.
- .17 Aluminum Header Extrusions: Shall be minimum 0.156" wall thickness.
- .18 Aluminum Extrusion Finish: Standard anodized finish shall be AA-M12-C22-A31 Clear.
- .19 Header Case: Shall be 5-1/2" wide by 6" high (124mm wide by 152 mm high) aluminum extrusion with structurally integrated end caps. The operator shall be sealed against dust, dirt, and corrosion within the header case. Access to the operator and electronic control box shall be provided by a full-length removable cover, edge rabbetted to the header to ensure a flush fit.
- .20 Linkage Assembly: Shall provide positive control of door through entire swing; shall permit use of butt hung, center pivot, and offset pivot-hung doors.
- .21 Door Arm Assembly: Shall be a door arm assembly consisting of a forged steel arm which fastens into web of top rail. The door arm shall fasten to the factory installed reinforcing plate. All parts shall be concealed in the top web of the door. The door arm shall be splined to the operator drive spindle for maximum holding and strength. The door arm assembly shall have no moving parts.
- .22 Controls: push plates, with moulding. Controls shall be mounted at 36,5" (930mm) above finished floor.
- .23 Entrapment Protection: The door forces and speeds generated during power opening and manual opening in both directions of swing, and spring closing in both directions of swing shall conform to the requirements of ANSI A156.
- .24 Automatic Operators shall:
 - .1 Be capable of functioning on doors weighing up to 158Kg.
 - .2 Be non-handed
 - .3 Incorporate the following adjustment capabilities: opening force, closing force, open speed, close speed and open check speed.
 - .4 Incorporate a non-ferrous cover not exceeding 150mm square in section.
 - .5 Incorporate a separate On-Off-Hold Open switch. Switch to be installed inside the unit.

- .6 Be microprocessor controlled and incorporate a position encoder.
- .7 Readily function with standard activation and safety sensors. Provide activation devices as required.
- .8 Function as a manual door closer without power applied, and shall power open/spring close with power applied.
- .9 Function with 115V AC electrical service for operation and standard low voltage connections for activation.

2.3 OPERATING CONDITIONS

- .1 Climatic Conditions: The operator shall be fully lubricated to minimize wear and friction of moving parts, and shall operate between -30 degrees F and +130 degrees F in all climatic conditions.

2.4 ELECTRICAL CONTROLS

- .1 Electrical control shall incorporate the following: An encoder on the motor shaft shall monitor revolutions and send signals to a microprocessor in the controller. Signals from the encoder define door position without using an external magnet and magnetic switch. The door position data is used for: carpet applications, electronic sensor (Sentrex) applications, open check calculation, MAGIC-TOUCH, and reverse-on-obstruction.
- .2 Full Energy / Low Energy Selectable: The microprocessor control shall be easily field adjustable to comply with ANSI A156.10 – Full Energy or ANSI A156.19 – Low Energy Code requirements. Field adjustments for door-opening speed, door-opening force, door-closing speed, door-closing force shall be provided without the requirement for additional components. Additionally the system shall have the ability to be converted from Full Energy to Low Energy with simple field modifications.
- .3 Life Cycle Data Counter (LCD): The microprocessor control shall incorporate an output to drive a non-re-settable counter used to aide in customer tailored maintenance programs.
- .4 Controller Protection: The microprocessor controller shall incorporate the following features to ensure trouble free operation. Automatic Reset Upon Power Up, Fuse Protection, Electronic Surge Protection, internal Power Supply Protection.
- .5 Learn speed. When power is first applied and an open signal is received, the controller shall open the door at a speed slightly faster than check speed which allows the controller to “learn” safely yet expediently.
- .6 A “watchdog” LED shall indicate that the controller is functioning properly by remaining lit (when power is on). Additional LED’s shall indicate proper operation of the motor encoder when the door moves.
- .7 The controller shall have program dip switched to allow selection or change at the following parameters: carpet or timer logic, single or dual door, normal operation or 2S logic, bifold sensor logic, normal back check or large back check, “MAGIC-TOUCH” on/off.
- .8 The MAGIC-TOUCH features shall allow door activation by manual action without the need for an approach sensor.
- .9 A “soft-start” “soft-stop” motor driving circuit shall be provided for smooth normal opening and recycling, thus minimizing loosening of doors, pivots, and frames.
- .10 A one second reverse-on-obstruction feature shall be provided to reverse door motion if an obstruction is met during door opening or closing.

- .11 A cam actuated emergency breakout switch shall be provided to disconnect power to the motor when an in-swinging door is manually pushed in the emergency out direction. The operator will then automatically reset and power will be resumed.
- .12 Fully adjustable opening speed and opening check speed. Control circuitry shall include a 0-30 second adjustable time delay.
- .13 Provide an internal transformer/power supply for approach sensor and Sentrex safety sensors.
- .14 Provide a "safety plus" – 1.5 seconds extension of both operate and safety signals after pressure has been removed from the control mats.
- .15 A safety carpet check feature shall monitor the safety carpet activation on every open cycle. If a safety carpet shall fail "open", the door shall be held open for 12 seconds as a signal to the owner that there is a problem.
- .16 Provide optional power-close accessory, provide optional closing speed control.

PART 3- EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for automatic entrances installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.
- .2 The door installer shall verify that the installation area is dry, clean and free of foreign matter. Check as-built conditions and verify the manufacturer's details for accuracy to fit the wall assembly prior to fabrication. Report in writing to the Contractor any detrimental conditions to the proper functioning of the swinging door operator and correct prior to any installation in accordance to manufacturer's recommendations

3.2 INSTALLATION

- .1 Provide 120 VAC, 10 amps minimum to electrical door operator. Electrical contractor shall provide service to each operator from junction box for multiple operators.
- .2 Installation shall be by an installer approved and trained by the manufacture in strict accordance with the manufacturer's instructions and fire marshal's listing requirements.
- .3 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .4 Install doors, frames, and screens in accordance with shop drawings and manufacturer's instructions.
- .5 Co-ordinate installation of components with related and adjacent work. Attach and seal air vapour barrier materials to perimeter framing. Attach and seal dampproofing flashings to perimeter framing.
- .6 Set work plumb, square, level, free from warp, twist and superimposed loads.
- .7 Securely anchor work in required position. Do not restrict thermal movement.

- .8 Brace frames rigidly for building-in. Supply temporary horizontal spreaders at third points of door openings to maintain frame width. Vertically support at centre, heads of openings over 1.2 m wide. Remove temporary bracing after framing is set.
- .9 Apply isolation coating to separate aluminum and primed or galvanized steel surfaces at points of contact with cementitious materials.
- .10 Pack fibrous insulation in shim spaces at perimeter of assembly [and void spaces between members to maintain continuity of thermal barrier.
- .11 Maintain clearances between head members and structure to ensure that structural loads are not transmitted to frames.
- .12 Install hardware using templates provided. Refer to Section 08 71 00 - Door Hardware for installation requirements.
- .13 Install door operator system in accordance with manufacturer's instructions, including piping controls, control wiring. Install remote power units.
- .14 Set tracks, header assemblies, operating brackets, rails and guides level and true to location, with adequate anchorage for permanent support.

3.3 FIELD QUALITY CONTROL

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its products, and submit written reports in acceptable format to verify compliance of Work with Contract within 3 days of review.
- .2 Manufacturer's Field Services: submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.4 ADJUSTING

- .1 After repeated operation of completed installation equivalent to three days of use by normal traffic (100 to 300 cycles), readjust door operators and controls for optimum, smooth operating condition and safety and for weather tight closure. Lubricate hardware, operating equipment and other moving parts.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

3.6 DEMONSTRATION

- .1 Demonstrate operation, operating components, adjustment features, and lubrication requirements to Owner.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by aluminum door and frame installation.

END OF SECTION

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PART 1- GENERAL

1.1 GENERAL

- .1 Glazed Aluminum Curtain Wall and Window System (including glazing) is to meet or exceed requirements of SB-10 of the Ontario Building Code.
- .2 Contractor to submit in writing, certification and test results that the proposed systems (including glazing), meets or exceeds requirements of SB-10 of the Ontario Building Code.

1.2 REFERENCES

- .1 ASHRAE/IES 90.1-1989
- .2 ANSI/ASHRAE/USGBC/IES 189.1-2009
- .3 Aluminum Association (AA): AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .4 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA CW-10-04, Care and Handling of Architectural Aluminum From Shop to Site.
 - .2 AAMA CW-11-85, Design Wind Loads and Boundary Layer Wind Tunnel Testing.
 - .3 AAMA T1R-A1-04, Sound Control for Fenestration Products.
 - .4 AAMA 501-05, Methods of Test for Exterior Walls.
 - .5 AAMA 611-98, Voluntary Specifications for Anodized Finishes Architectural Aluminum.
 - .6 AAMA 612-02, Voluntary Specifications, Performance Requirements, and Test Procedures for Combined Coatings of Anode Oxide and Transparent Organic Coatings on Architectural Aluminum.
 - .7 AAMA 2603-02, Voluntary Specification Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - .8 AAMA 2604-05, Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- .5 ASTM International
 - .1 ASTM A 36/A 36M-08, Specification for Carbon Structural Steel.
 - .2 ASTM A 123/A 123M-09, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A 167-99(2009), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .4 ASTM A 653/A 653M-09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM B 209-07, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .6 ASTM B 221-08, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .7 ASTM E 283-04, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .8 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .9 ASTM E 331-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .10 ASTM E 413-04, Classification for Rating Sound Insulation.
 - .11 ASTM E 1105-00(2008), Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

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- .6 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint.
 - .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
- .7 CSA International
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S136-07, North American Specification for the Design of Cold Formed Steel Structural Members.
 - .3 CAN/CSA-S157/S157.1-05, Strength Design in Aluminum/Commentary on CAN/CSA-S157, Strength Design in Aluminum.
 - .4 CSA W59.2-M1991(R2008), Welded Aluminum Construction.
- .8 Society for Protective Coatings (SSPC)
 - .1 SSPC - Paint 20-02(R2004), Zinc Rich Coating, Type I - Inorganic and Type II - Organic.
 - .2 SSPC - Paint 25 - 97(R2004) BCS, Zinc Oxide, Alkyd, Linseed Oil and Primer for Use Over Hand Cleaned Steel Type 1 and Type 2.
- .9 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Co-ordination: co-ordinate work of this Section with installation of fire stopping, air barrier placement, vapour retarder placement, flashing placement, installing ductwork to rear of louvres, perimeter heating, rough carpentry and components or materials.

1.4 EXAMINATION

- .1 Examine the structure to which work is to be fixed and report any deficiency which is detrimental to the proper installation of the work.
- .2 Verify all dimensions on site, and site dimension to ensure that adjustments in fabrication and installation are provided for and clearances to other construction have been maintained.
- .3 Report any defects discovered to the Architect and do not commence work before these have been remedied. Commencement of work shall be construed as acceptance of underlying conditions.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for curtain wall components, anchorage and fasteners, glass and infill, and internal drainage details and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.

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- .2 Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
- .4 Samples: Provide Mock-Up on Site as directed by Architect.
- .5 Test Reports:
 - .1 Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data:
 - .1 Window classifications A3, B7, C5 for opening windows, and A2, B2, C2 for fixed sash.
 - .2 Enamelled finish.
 - .3 Air tightness fixed rating.
 - .4 Water tightness B-7 rating.
 - .5 Wind load resistance C-5 rating.
 - .6 Condensation resistance I @58.1.
 - .7 Sash strength and stiffness – projecting.
 - .8 Ease of operation - windows with operable lights.
 - .9 Forced entry resistance.
 - .10 Mullion deflection - combination and composite windows.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for glazed aluminum curtain wall and operating sashes for incorporation into manual.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Handle work of this Section in accordance with AAMA CW-10.
 - .2 Store materials off ground, indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .3 Store and protect aluminum glazed curtain wall components from nicks, scratches, and blemishes.
 - .4 Protect prefinished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
 - .5 Replace defective or damaged materials with new.

1.8 AMBIENT CONDITIONS

- .1 Install sealants when ambient and surface temperature is above 5 degrees C minimum.
- .2 Maintain this minimum temperature during and for 48 hours minimum after installation of sealants.

1.9 WARRANTY

- .1 From the date of Certificate of Substantial Performance, the hermetically sealed glazing units

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- shall be warranted for a period of **five (5) years** against vision obstruction due to the formation of dust or film on the internal surfaces, caused by the failure of the hermetic seal other than through glass breakage.
- .2 All other parts of the work shall be warranted against defects due to faulty materials and/or workmanship for a period of **three (3) years** from the date of the Certificate of Substantial Performance.
 - .3 Repair and/or replace when so directed by the Architect, within the said periods, any and all portions of work which fail to perform according to the requirements of these Specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Extruded aluminum: to ASTM B 221.
- .2 All aluminum extrusions shall be 6063 TS aluminum alloy with a T5 temper. Sash members shall be tubular, with a nominal wall thickness of 1.5 mm generally and 2.3 mm at areas which receive operating hardware.
- .3 All visible interior portions of aluminum surfaces for frames and sashes shall be given anodic oxide treatment in accordance with Aluminum Association Specification AA-M12C22A31 #17 Clear.
- .4 All visible exterior portions of aluminum surfaces of frames and sashes shall be given a thermo setting acrylic enamel coating in accordance with CAN/CGSB 63-GP2M.
- .5 Exterior aluminum sills shall be break formed aluminum sheet metal of type and size as detailed and/or to suit job conditions, minimum 2mm thick, complete with joint covers, end caps and drip deflectors, drains, anchoring devices and end pieces. Sills shall be #17 clear anodized.
- .6 Insect screen framing shall be of same colour as curtain wall frames. Insect screen shall be black fiberglass mesh.
- .7 Weatherstripping: shall be flexible vinyl spline with durometer rating 60.
- .8 Sheet aluminum: to ASTM B 209. Shall be 3mm thick.
- .9 Sheet steel: to CSA S136 and ASTM A 653/A 653M; galvanized.
- .10 Steel sections: to CSA G40.20/G40.21, ASTM A 36/A 36M and ASTM A 167 Type 304 stainless; shaped to suit mullion sections.
- .11 Anchors: 3-way adjustable hot-dip galvanized cast iron.
- .12 Fasteners: stainless steel, finish to match curtain wall.
- .13 Bituminous paint: CAN/CGSB 1.108, without thinner.
- .14 Fire Safety Materials: see Section 07 84 00 - Fire Stopping.
- .15 Sealant: To CAN/CGSB-19.13, Class 40, one component cold-applied, non-sagging silicone. Acceptable material: Dow Corning 795.

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2.2 HARDWARE

- .1 Provide two (2) locking claw handles.
- .2 Provide roto operators, under screen push bars if they are not acceptable.
- .3 For operating sashes, provide 100 mm limiters to restrict the extension of the sashes when in the open position.

2.3 FABRICATION

- .1 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .3 Prepare components to receive anchor devices. Install anchors.
- .4 Arrange fasteners and attachments to ensure concealment from view.
- .5 Prepare system components to receive exterior doors, and hardware.
- .6 Reinforce framing members for external imposed loads.
- .7 Visible manufacturer's identification labels not permitted.
- .8 Infill Panels:
 - .1 Fabricate infill panels with metal covered edge seals around perimeter of panel assembly, enabling installation and minor movement of perimeter seal.
 - .2 Reinforce interior surface of exterior panel sheet from deflection caused by wind and suction loads.
 - .3 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
 - .4 Place insulation within panel, adhered to exterior face of interior panel sheet over entire area of sheet with impale fasteners.
 - .5 Ventilate and pressure equalize the air space outside the exterior surface of the insulation, to the exterior.
 - .6 Arrange fasteners and attachments to ensure concealment from view.
- .9 Finishes:
 - .1 Exterior exposed aluminum surfaces: to AAMA A41 or A42 or A43, anodized, 0.7 mils thick or greater (Architectural Class I).
 - .2 Exterior exposed infill panel surfaces: to AAMA A43, Duranar Finish, Aluminum Colour.

2.4 ISOLATING COATING

- .1 Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.

2.5 SOURCE QUALITY CONTROL

- .1 Perform work in accordance with AAMA GSM-1 and AAMA CW-I-9. Maintain 1 copy on site.
- .2 Manufacturer qualifications: company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.

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- .3 of a Professional Structural Engineer experienced in design of this Work and licensed at the place where the Project is located.
- .4 Perform welding Work in accordance with CSA W59.2.

2.6 FABRICATION

- .1 Fabricate in accordance with CAN/CSA-A440-00 supplemented as follows:
 - .1 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
 - .2 Face dimensions detailed are maximum permissible sizes.
 - .3 Brace frames to maintain squareness and rigidity during shipment and installation.
 - .4 Finish steel clips and reinforcement for fire rated windows with 380 g/m² zinc coating to CSA G164.
- .2 Provide 2 mm thick, aluminum drip flashing at the head of ALL curtain walls.

2.7 INSULATED SANDWICH PANELS

- .1 At exposed exterior face of panel, provide 6 mm thick opaque spandrel glass. Opaque glass coating shall be DTG Coating System for Architectural Glass by PPG. Colour to be selected from manufacturer's full range of colours. Glass shall be **tempered** glass.
- .2 Insulate sandwich panels with minimum 100 mm thick semi-rigid insulation. Curtainrock semi-rigid insulation as manufactured by Roxul Inc.
- .3 Where back-up spandrel panels are exposed to view in the building interior, 3 mm (0.12") thick aluminum sheets shall be used. Finish shall match curtain wall frame.
- .4 Where back-up spandrel panel is not exposed to view use minimum 0.9 mm thick (20 gauge) galvanized sheet steel at interior face of panel.

2.8 VENTILATING SASH FABRICATION

- .1 Projected Ventilator Units: medium duty units with thermal break: to CAN/CSA-A440.3-98, Class A3, B7, C5, and D2, hopper vent, projecting in units.
 - .1 Acceptable Product: Alumicor UniVent 1375AW Insert Vent or Equivalent by Prevost or Kawneer.
 - .2 Colour to match curtain wall frame colour.
- .2 Sash members shall be factory assembled and shall have corners machine cut at 45 degrees with concealed structural corner fastening.
- .3 Entire perimeter of sash shall close on double flexible vinyl weatherstripping which is inserted into integral grooves in extruded aluminum sash and weathering sections to give two (2) point weathering contact.
- .4 One (1) piece sill adaptor shall be sloped to exterior for weathering.
- .5 Positive aligning corner clips shall be inserted into integral grooves to exterior face of sash.
- .6 Glazing stops shall be snap-in type, installed from the interior, and held in place by means of integral groove in sash surround.

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- .7 As required, reinforce sashes to size of unit.
- .8 Provide two (2) vertical security cam handles per window vent. Cam handles shall be in a finish to match window colour. Supply and install gaskets with claws
- .9 For operating sashes, provide 100 mm limiters to restrict the extension of the sashes when in the open position.

2.9 CURTAIN WALL SYSTEM

- .1 Acceptable Product: Alumicor 2600 or equivalent by Prevost or Kawneer.
- .2 Provide reinforcing of mullions as required. Frame Depth: 168 mm (6.63")
- .3 Caps shall be 19 mm, unless noted otherwise.
- .4 Structural silicone joints where indicated.
- .5 The system shall be designed to meet wind load requirements, maximum stress of 0.96 KPA (20 PSI) and have a maximum deflection of L/200 of the span.
- .6 The entire curtain wall system shall be designed according to the "Open Rain Screen" principle and shall provide:
 - .1 Gaskets, sleeved spigotted joints, and seals necessary to ensure rain water does not enter the cavities of the system.
- .7 Mullion sections shall be tubular extruded sections when the system is designed for spigot joinery, and split mullion extruded sections when screw spline joinery is to be used. Incorporate split mullions as required to allow for thermal expansion.
- .8 All horizontal sections shall form equalized pressure and sealed gutter members.
- .9 Vertical expansion and construction joints shall be sleeved spigotted joints between mullion ends in combination with an applied sealant.
- .10 Provide structural steel supports, brackets and all anchoring to building structure, anchors shall have three-way adjustment. Welding shall be completed after curtain wall is aligned. Touch up painting of welded areas shall be done on site.

2.10 GLAZING OF CURTAIN WALL SYSTEM

- .1 Glaze curtain walls in accordance with CAN/CSA- A440. Refer to Section 08 80 50 for glass and glazing materials.

2.11 PUNCH WINDOW

- .1 Fixed Units: medium duty units with thermal break to CAN/CSA-A440.3-98, Classifications: fixed for air leakage, B3 (water leakage), C3 (wind load resistance), and D2 (condensation resistance):
 - .1 Acceptable Product: Kawneer 518 Isoport Window or Alumicor 970E series with a 189mm (6 1/4") frame or Prevost 1300 series.
 - .2 All frames shall be complete with factory installed rigid insulation in jamb, head, and sill sections.
- .2 Window frames shall be factory fabricated in accordance with reviewed shop drawings. They shall be cut, drilled and assembled using jigs to ensure proper hairline fit.

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- .3 Overall depth of frame shall be 108 mm minimum. The maximum allowed sight lines shall be as follows. Except where noted otherwise, jamb, sill and head members only shall be open sections with an exterior face of 41 mm and an interior face of 25 mm. All intermediate members shall be tubular sections with an exterior face of 64 mm and an interior face of 25 mm approximately. Open sections for intermediate members shall not be acceptable.
- .4 Provide 2 mm thick, aluminum drip flashing at the head of the window.
- .5 Frame sections shall incorporate integral screw ports for mechanical fastening of all corners and intermediate joints. 38 mm, 1-1/2" #8 self-tapping screws or spigots shall be used.
- .6 All assembly screws, fixing screws, and fastenings of any nature shall be concealed. No exposed fastening devices shall be permitted.
- .7 Main framing member shall incorporate integral groove to receive snap-in glazing bead where applicable.
- .8 Provide 3 mm thick break formed aluminum sills to shapes and sizes shown on the drawings. Sills shall be complete with matching end pieces and anchors or brackets. Apply the specified finish after fabrication. Provide exterior and interior sills as indicated on drawings

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for aluminum curtain wall installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Verify dimensions, tolerances, and method of attachment with other work.
 - .3 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this Section.
 - .4 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .5 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION (GENERAL)

- .1 Install curtain wall and sloped glazing system in accordance with manufacturer's instructions.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Use alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .5 Use thermal isolation where components penetrate or disrupt building insulation.
- .6 Install sill flashings.
- .7 Install eave edge flashings at sloped glazing system.

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- .8 Co-ordinate installation of fire stop insulation, specified in Section 07 84 00 - Fire Stopping, at each floor slab edge and intersection with vertical construction where indicated.
- .9 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .10 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .11 Install fire-safing in areas as indicated.
- .12 Install operating sash in accordance with Section 08 80 50 - Glazing.
- .13 Install louvres, associated flashings, blank-off plates and screening. Fit blank-off plates tight to ductwork.
- .14 Install glass and infill panels in accordance with Section 08 80 50 – Glazing. Place sealant on the up-slope side of the pressure plate cover caps; finish the surface with a slope to encourage drainage over the cap. Cover caps to conceal screws and ensure continuous sightline.
- .15 Install perimeter sealant to method required to achieve performance criteria. Backing materials, and installation criteria in accordance with Section 07 92 00 - Joint Sealants.

3.3 INSTALLATION OF CURTAIN WALL SYSTEMS

- .1 Install curtain wall system in accordance with reviewed shop drawings. CAN/CGSB-A440.3-98 and to CAN/CGSB-63.14-M89.
- .2 Provide all steel angles, brackets, supports and anchors required for the complete installation.
- .3 Install curtain wall system plumb, level, square, free from warp, twist or other defect, and anchor securely to provide complete adequate resistance to stresses expected in service.
- .4 Make adequate provision for thermal expansion of the curtain wall system.
- .5 Secure and shim curtain wall system with non-corrosive and inorganic materials. Anchors, clips, blocking, shims, and all other attachments shall be concealed. Provide all fastenings and clips required for positive fastening of frames to concrete block wall and/or steel stud wall.
- .6 Fasteners at heads shall allow for minimum 12 mm deflection of the building structure.

3.4 SILL INSTALLATION

- .1 Aluminum sills shall be 2 mm thick break formed aluminum sheet metal of type and size as detailed and/or to suit job conditions, minimum 2 mm thick, complete with joint covers, jamb drip deflectors, anchoring devices and end pieces. Colour of sills to match curtain wall system colour.
- .2 Install sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece at each location.
- .3 Secure sills in place with anchoring devices located at ends and evenly spaced 600 mm oc in between.
- .4 Fasten drip deflectors with self tapping Installation stainless steel screws.
- .5 Provide interior sills where shown on drawings. Fabricate from 2 mm thick formed aluminum to

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shape and dimension indicated.

3.5 CAULKING (JOINT SEALANTS)

- .1 Seal joints between curtain wall frame and sill with sealant. Bed drip deflectors in bedding compound. Caulk between sill upstand and curtain wall frame. Caulk butt joints in continuous sills.
- .2 Apply sealants in accordance with Section 07 92 00 – Joint Sealants. Conceal sealant within curtain wall units except where exposed use is permitted by the Architect.

3.6 SITE TOLERANCES

- .1 Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.
- .2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.
- .3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

3.7 FIELD QUALITY CONTROL

- .1 Inspection by independent testing agency will monitor quality of installation and glazing. Test system to: ASTM E 1105, and AAMA 501.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer of curtain wall and glass verifying compliance of Work, in handling, installing, applying, protecting and cleaning of products, and submit written reports in acceptable format to verify compliance of Work with Contract within 3 days of review.
 - .2 Submit 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 Ensure manufacturer's representative of curtain wall and glass is present before and during critical periods of installation.

3.8 ADJUSTING

- .1 Adjust operating sash for smooth operation.

3.9 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Leave Work area clean at end of each day.
- .3 Remove protective material from prefinished aluminum surfaces.
- .4 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .5 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
- .6 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

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3.10 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by glazed aluminum curtain wall installation.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Architectural Millwork.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.9-2003, Cabinet Hardware.
 - .2 ANSI/BHMA A156.11-2004, Cabinet Locks.
 - .3 ANSI/BHMA A156.16-2008, Auxiliary Hardware.
 - .4 ANSI/BHMA A156.18-2006, Materials and Finishes.
 - .5 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit manufacturer's instructions, printed product literature and data sheets for cabinet hardware and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit contract hardware list. Indicate specified hardware, including make, model, material, function, finish and other pertinent information.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for cabinet hardware for incorporation into manual.

1.5 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 The supplier shall satisfy himself as to the suitability of all hardware and advise the Architect of any discrepancies. All hardware installation shall be according to manufacturer's requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with

- .2 manufacturer's recommendations in clean, dry, well-ventilated area.
- .3 Store and protect cabinet hardware from nicks, scratches, and blemishes.
- .3 Protect prefinished surfaces with wrapping.
- .4 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's product for all similar items.

2.2 FINISHES

- .1 Finish of all plated hardware shall be C32D, brushed stainless steel except where indicated otherwise.

2.3 QUANTITIES

- .1 Quantity and sizes shall be determined from drawings

2.4 CABINET HARDWARE

- .1 UPPER AND LOWER CABINETS WITH 19 MM (3/4") DOORS (PAIRS)

- 2 pr. Hinges: Fully Concealed, 110 deg Modular opening, self-closing, Hettich Model #742-T-42. Use #8 screws for fastening.
- 2 Pulls: C.B.H. Model 240 - 100mm C32D
- Pilasters: No. 255ZC by K.V., length to suit (recessed)
- Shelf Clips: No. 256 by K.V. (4 per shelf)
- Door Dumpers: "Bump On" by 3M - clear rubber

- .2 ADJUSTABLE SHELVING STANDARDS

- Pilasters: No. 255 ZC by K.V., length to suit (recessed)
- Shelf Clips: No. 256 by K.V.

- .3 HOOKS FOR CUBBIES

Resettable "Henkel HDB003R" Hook. Colour to be selected by Owner

- .4 COAT RAILS

Chrome or nickel plated oval tube, 30 mm high x 15 mm wide, cut to required length. Provide matching end supports and intermediate hangers where required. Provide rails as indicated on drawings. Standard of acceptance: Richelieu #170-140 or 170-3-140, c/w #7837-180 end supports.

- .5 MISCELLANEOUS HARDWARE ITEMS

To be determined from drawings and millwork details. To suit conditions as required and to the satisfaction of the Architect

2.5 FASTENINGS

- .1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .2 Exposed fastening devices to match finish of hardware (use exposed fasteners only when approved in writing by Architect).
- .3 Use fasteners compatible with material through which they pass.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Install hardware to standard hardware location dimensions in accordance with manufacturer's recommendations and to project design requirements.

3.2 ADJUSTING

- .1 Adjust cabinet hardware for optimum, smooth operating condition.
- .2 Lubricate hardware and other moving parts.
- .3 Adjust cabinet door hardware to ensure tight fit at contact points with frames.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
 - .3 Remove protective material from hardware items where present.
 - .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.4 DEMONSTRATION

- .1 Brief maintenance staff regarding:
 - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
 - .2 Description, use, handling, and storage of keys.
- .2 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.

- .2 Repair damage to adjacent materials caused by cabinet and miscellaneous hardware installation.

END OF SECTION

PART 1- GENERAL

1.1 RELATED SECTIONS

- .1 Section 08 11 00 - Metal Doors And Frames.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1-2000, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.2-2003, Bored and Preassembled Locks and Latches.
 - .3 ANSI/BHMA A156.3-2001, Exit Devices.
 - .4 ANSI/BHMA A156.4-2000, Door Controls - Closers.
 - .5 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
 - .6 ANSI/BHMA A156.6-2005, Architectural Door Trim.
 - .7 ANSI/BHMA A156.8-2005, Door Controls - Overhead Stops and Holders.
 - .8 ANSI/BHMA A156.10-1999, Power Operated Pedestrian Doors.
 - .9 ANSI/BHMA A156.12-2005, Interconnected Locks and Latches.
 - .10 ANSI/BHMA A156.13-2002, Mortise Locks and Latches Series 1000.
 - .11 ANSI/BHMA A156.14-2002, Sliding and Folding Door Hardware.
 - .12 ANSI/BHMA A156.15-2006, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
 - .13 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
 - .14 ANSI/BHMA A156.18-2006, Materials and Finishes.
- .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA): CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.
- .3 All hardware for fire rated openings shall meet ULC or Warnock-Hersey testing as required.
- .4 All fire and life safety codes shall be met as required by the authority having jurisdiction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's instructions, printed product literature and data sheets for door hardware and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Hardware Schedule:
 - .1 Submit contract hardware list. Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .4 Manufacturer's Instructions: submit manufacturer's installation instructions.
- .5 Furnish other sections with two (2) complete sets of hardware templates for related fabricating and installation.
- .6 Submit for owner review and comments two (2) key schedules listing the door number, hardware heading or item, lock function and the key group.
- .7 Closeout Submittals
 - .1 Provide operation and maintenance data for door closers, locksets, door holders

electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
 - .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect door hardware from nicks, scratches, and blemishes.
 - .3 Protect prefinished surfaces with wrapping.
 - .4 Replace defective or damaged materials with new.

1.6 WASTE DISPOSAL AND MANAGEMENT

- .1 Separate and recycle waste materials in AND MANAGEMENT accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of corrugated cardboard polystyrene plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

1.7 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 – Closeout Submittals.
 - .2 Supply two sets of wrenches for door closers locksets and fire exit hardware.

PART 2 – PRODUCTS

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products only for similar items.

2.2 DOOR HARDWARE

- .1 Locks and latches:
 - .1 Locks and latches: to ANSI/BHMA A156.13, mortise lock sets, designed for function as stated in Hardware Schedule.
 - .2 Latch bolts to be anti friction with separate latch guard.
 - .3 ULC labels and 19mm throw for all fire rated doors.
 - .4 Auxiliary dead bolts to have hardened steel pin inserts.
 - .5 Lever trim is required, trim to have concealed through bolt mounting and the lever is to be solid cast or forged material with a return to the door face.
 - .6 Finished as stated in Hardware Schedule.
 - .7 Acceptable Manufacturers:
 - .1 Sargent.
- .2 Ball Bearing Hinges:
 - .1 Acceptable Manufacturers:
 - .1 Hager Companies
- .3 Continuous Hinges:
 - .1 Acceptable Manufacturers:
 - .1 Continuous Roton Hinges
- .4 Exit devices: to ANSI/BHMA A156.3 and ULC S132-93 (R2001).
 - .1 Low profile push pad style. Outside trim to have the same trim design as the locksets.
 - .2 Furnish all devices in dull chrome plated finish.
 - .3 Exit hardware must have the correct life safety or fire rated labels attached to the active case.
 - .4 Ensure that the actuating push pad covers 1/2 of the door opening.
 - .5 Exit devices installed on exterior doors to have dead latching bolts which ensure tamper proof security.
 - .6 Where pairs of doors are indicated, have two (2) vertical rod exit devices. Ensure that no overlapping astragal is used by the door manufacturer.
 - .7 Acceptable Manufacturers:
 - .1 Sargent
- .5 Door Closers and Accessories:
 - .1 Door controls (closers): to ANSI/BHMA A156.4.
 - .2 To have full adjustment features including back check, general speed, and latch speed control.
 - .3 All interior door closers to have reduced opening force spring power of 22N as required by the barrier free codes.
 - .4 Surface mounted door closers are to be located on the room side of the door whenever possible.
 - .5 Provide all mounting plates for door closers required to mount on special door and frame conditions. Check all door and frame details from related trades to ensure dimensions have not changed and hardware will not conflict with window lite kits.
 - .6 Where listed, door closers are to have full body covers to match the project finishes.
 - .7 Acceptable Manufacturers:
 - .1 LCN 4041.
- .6 Architectural door trim: to ANSI/BHMA A156.6, as listed in Hardware Schedule.
 - .1 All kick plates, push plates, and bumper plates must have all sides bevelled and corners rounded to ensure there are no sharp edges. Supply plates with tape mounting or if screws are listed, with counter sunk screw holes. The plates will be .050 thick unless listed otherwise. Size to suit door width. Kickplate will be door width less 35 mm for single door and less 25 mm for pairs of doors.

- .2 When push plates are listed with door pulls, install the push plate to conceal the through bolt.
- .3 Pulls to be supplied with back to back (BTB) or through bolt mounting.
- .4 All escutcheon plates to have a three digit room number engraved. Numbers to be 19mm high, Helvetica Medium, filled black.
- .5 Acceptable Manufacturers:
 - .1 Hager
- .7 Door stops and holders:
 - .1 Wall stops are only to be used on proper wall conditions such as block or masonry. Supply floor stops with sufficient height to suite the floor condition or undercut of doors.
 - .2 Overhead stops and holders to be surface mounted unless there is a conflict with door closers or other hardware. Provide door stays with friction action in locations that do not have door closers. Install overhead stops and holders for 90 DEG stop unless otherwise specified.
 - .3 Electronic door holder to be supplied to suit the specified voltage and be connected to the fire alarm system to release the door when signalled.
 - .4 Acceptable Manufacturers:
 - .1 Sargent
 - .2 Hager.
- .8 Door seals:
 - .1 Perimeter seals to be supplied to fully cover all gaps between the door, frame, and floor condition to seal against weather, sound, or smoke.
 - .2 Frame gasketing to be closed cell neoprene. The extruded housing to have a rib to prevent distortion during installation. Aluminum frames to be equipped with felt inserts by the frame supplier.
 - .3 Door bottoms will be heavy duty and have an adjustment screw to ensure proper contact with the floor. Supply the correct drop insert for carpet where required.
 - .4 Supply thermally broken thresholds for all exterior door openings.
 - .5 Acceptable Manufacturers:
 - .1 KN Crowder.

2.3 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Use fasteners compatible with material through which they pass.

PART 3- EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data

sheets.

- .2 Supply metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Supply manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

- .1 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).
- .2 Use only manufacturer's supplied fasteners. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

3.3 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure. If a manufacturer's representative has done this work, forward written confirmation of same.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to ensure tight fit at contact points with frames.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
 - .3 Remove protective material from hardware items where present.
 - .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

HARDWARE GROUPS ON FOLLOWING PAGES.

END OF SECTION

Finishing Hardware Schedule

Cambridge Public School **Embrun ON**

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Consultant: **Mike Schwaab, CFDAI**

Plans Dated: **IFBP**

Submittal Date: **December 3, 2025**

Cambridge Public School
Embrun ON

Submittal Date: December 3, 2025

Openings

Opening Number(s)	Qty	Location 1	To/ From	Location 2	Nominal Width	Nominal Height	Door Thickness	Door Mat'l	Frame Mat'l	Hand	Label
001	1	Exterior	From	Vestibule 001	965, 711	2135		AL	AL	RHRA	
001a	1	Vestibule 001	From	Corridor 002	965, 711	2135		AL	AL	RHRA	
002	1	Corridor 002	From	Existing Corridor	965, 863	2135	45	HM	PS	LHRA	1 HOUR
003	1	Exterior	From	Vestibule 003	965, 711	2135		AL	AL	RHRA	
003a	1	Vestibule 003	From	Corridor 005	965, 711	2135		AL	AL	RHRA	
008	1	Exterior	From	Vestibule 008	965, 863	2135		AL	AL	RHRA	
008a	1	Vestibule 008	From	Corridor 002	965, 863	2135		AL	AL	RHRA	
010	1	Exterior	From	Vestibule 007	965, 965	2135		AL	AL	LHRA	
010a	1	Vestibule 010	From	Corridor 009	965, 965	2135		AL	AL	LHRA	
101	1	Corridor 002	To	Storage 101	965	2135	45	HM	PS	LH	
102	1	Corridor 002	To	Custodian	965	2135	45	HM	PS	LH	
103	1	Corridor 002	To	IT Room	965	2135	45	SCW	PS	LH	
104a	1	Corridor 002	To	Mech. 104a	965	2135	45	HM	PS	LH	
104b	1	Mech. 104a	To	Elect. 104B	965	2135	45	HM	PS	LH	
105	1	Corridor 002	To	Boys WC. 105	965	2135	45	HM	PS	LH	
106	1	Corridor 002	To	Girls WC. 106	915	2135	45	HM	PS	RH	
107	1	Corridor 004	To	WC 107	965	2135	45	HM	PS	LH	
108	1	Corridor 004	To	UNI. WC 108	965	2135	45	HM	PS	LH	
109a	1	Corridor 004	To	Spec. Ed. 109a	965	2135	45	SCW	PS	RH	
109b	1	Spec. Ed. 109a	To	WC 109B	965	1200	45	SCW	PS	RH	
110	1	Corridor 004	To	Resource 110	965	2135	45	SCW	PS	LH	
111	1	Corridor 004	From	General Purpose 111	965	2135	45	SCW	PS	RHR	
111a	1	Corridor 004	From	General Purpose 111	965	2135	45	SCW	PS	LHR	
112	1	Corridor 004	To	Classroom 112	965	2135	45	SCW	PS	RH	
113	1	Corridor 004	To	Resource 113	965	2135	45	SCW	PS	LH	
114	1	Corridor 007	To	Boys WC. 114	965	2135	45	SCW	PS	RH	
115	1	Corridor 007	To	Girls WC 115	965	2135	45	HM	PS	LH	
116	1	Corridor 009	To	Classroom 116	965	2135	45	SCW	PS	LH	
117	1	Corridor 009	To	Classroom 117	965	2135	45	SCW	PS	RH	
118	1	Corridor 009	To	Classroom 118	965	2135	45	SCW	PS	LH	
119	1	Corridor 009	To	Music 119	965	2135	45	SCW	PS	RH	
120	1	Corridor 009	To	Classroom 120	965	2135	45	SCW	PS	LH	
121	1	Corridor 009	To	Classroom 121	965	2135	45	SCW	PS	RH	
122	1	Corridor 009	To	Classroom 122	965	2135	45	SCW	PS	LH	
123	1	Corridor 009	To	Classroom 123	965	2135	45	SCW	PS	RH	

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<u>Opening Number(s)</u>	<u>Qty</u>	<u>Location 1</u>	<u>To/ From</u>	<u>Location 2</u>	<u>Nominal Width</u>	<u>Nominal Height</u>	<u>Door Thickness</u>	<u>Door Mat'l</u>	<u>Frame Mat'l</u>	<u>Hand</u>	<u>Label</u>
124	1	Corridor 009	To	Classroom 124	965	2135	45	SCW	PS	LH	
125	1	Corridor 009	To	Classroom 125	965	2135	45	SCW	PS	RH	
126	1	Corridor 004	To	Classroom 126	965	2135	45	SCW	PS	RH	
127	1	Corridor 004	To	Classroom 127	965	2135	45	SCW	PS	LH	
128	1	Corridor 004	To	Kindergarten 128	965	2135	45	SCW	PS	LH	
128b	1	Kindergarten 128	To	WC 128B	965	1200	45	SCW	PS	LH	
129	1	Corridor 004	To	Kindergarten 128	965	2135	45	SCW	PS	RH	
129b	1	Kindergarten 128	To	WC 129B	965	2135	45	SCW	PS	RH	
130	1	Corridor 005	To	Kindergarten 131	965	2135	45	SCW	PS	LH	
130b	1	Kindergarten 130	To	WC 130B	865	1200	45	SCW	PS	LH	
131	1	Corridor 005	To	Kindergarten 131	965	2135	45	SCW	PS	LH	
131b	1	Kindergarten 131	To	WC 131B	865	1200	45	SCW	PS	LH	
132	1	Corridor 005	To	Kindergarten 132	965	2135	45	SCW	PS	RH	
132b	1	Kindergarten 132	To	WC 132B	865	1200	45	SCW	PS	RH	

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Hardware Schedule

Heading #1

1 Pair of doors 001, Exterior From Vestibule 001

RHRA

965, 711 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
1	Removable Mullion	4954-83"--689- 154	689
1	Exit Device	CD-35A-NL-OP-626-711 x 2135 Door -RHR-388/626- 4' Bar 299	626/626
1	Cylinder	12E72(Std.)RP 626	626
1	Exit Device	CD-35A-EO-626-965 x 2135 Door -LHR- 299	626
2	Cylinder	1E74(Std.)C4RP3 626	626
		* Cylinder dogging. Supplier to confirm cam requirements	
3	Construction Core	7145333 (7p)	
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
2	Surface Closer	4040XP LONG (Top Jamb) 689	689
2	Mounting Plate	4040XP-18TJ 689	689
2	Wall Door Stop	GSH 240 C32D	US32D
1	Perimeter Weatherstrip	By Door Supplier	
1	Threshold	CT-808 x 72"	
2	Threshold Stop	CT-40S x 38"	
2	Door Sweep	W-24S-CA x 38"	CA
1	Mullion Seal	5100N-86"	

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Heading #2

1 Pair of doors 001a, Vestibule 001 From Corridor 002

RHRA

965, 711 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
2	Horizontal Push Bar	GSH 5000-2 C32D # 4B * confirm length with door supplier	US32D
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
2	Surface Closer	4040XP LONG (Top Jamb) 689	689
2	Mounting Plate	4040XP-18G 689	689
1	Overhead Door Stop	104S US32D	US32D
1	Overhead Door Stop	103S US32D	US32D

Heading #3

1 Pair of doors 002, Corridor 002 From Existing Corridor

LHRA

965, 863 x 2135 x 45 - HM DR x PS FR - 1 HOUR

1	Continuous Hinge	780-224 HD 83" Clear LHR UL - FF	Clear
1	Continuous Hinge	780-224 HD 83" Clear RHR UL - FF	Clear
1	Exit Device	9847-L-F-626-965 x 2135 Door 45-LHR- LBR-996L-V/626-- 4' Bar	626/626
1	Exit Device	9847-L-F-626-863 x 2135 Door 45-RHR- LBR-AFL-996L-V/626	626/626
2	Cylinder	12E72(Std.)RP 626	626
2	Construction Core	7145333 (7p)	
1	Surface Closer	4040XP EDA 689 LH 45 * Install LHR closer for 180 degree opening	689
1	Surface Closer	4040XP EDA 689 RH 45 * Install LHR closer for 180 degree opening	689
1	Kick Plate	GSH 80A C32D (8" x 37") TM	US32D
1	Kick Plate	GSH 80 C32D (8" x 33") TM	US32D
2	Electro-Magnetic Holder	SEM 7850 689 120V	689
2	Door Silencer	SR64 GRY	GRY

* Wall magnets to be tied to fire alarm by Electrician and release upon alarm

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Heading #4

1 Pair of doors 003, Exterior From Vestibule 003

RHRA

965, 711 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
1	Removable Mullion	4954-83"--689- 154	689
1	Exit Device	CD-35A-NL-OP-626-711 x 2135 Door -RHR-388/626- 4' Bar 299	626/626
1	Cylinder	12E72(Std.)RP 626	626
1	Exit Device	CD-35A-EO-626-965 x 2135 Door -LHR- 299	626
2	Cylinder	1E74(Std.)C4RP3 626	626
		* Cylinder dogging. Supplier to confirm cam requirements	
3	Construction Core	7145333 (7p)	
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
2	Surface Closer	4040XP LONG (Top Jamb) 689	689
2	Mounting Plate	4040XP-18TJ 689	689
2	Wall Door Stop	GSH 240 C32D	US32D
1	Perimeter Weatherstrip	By Door Supplier	
1	Threshold	CT-808 x 72"	
2	Threshold Stop	CT-40S x 38"	
2	Door Sweep	W-24S-CA x 38"	CA
1	Mullion Seal	5100N-86"	

Heading #5

1 Pair of doors 003a, Vestibule 003 From Corridor 005

RHRA

965, 711 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
2	Horizontal Push Bar	GSH 5000-2 C32D # 4B	US32D
		* confirm length with door supplier	
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
2	Surface Closer	4040XP LONG (Top Jamb) 689	689
2	Mounting Plate	4040XP-18G 689	689
1	Overhead Door Stop	104S US32D	US32D
1	Overhead Door Stop	103S US32D	US32D

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Submittal Date: December 3, 2025

Heading #6

1 Pair of doors 008, Exterior From Vestibule 008

RHRA

965, 863 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
1	Removable Mullion	4954-83"--689- 154	689
1	Exit Device	CD-35A-NL-OP-626-863 x 2135 Door -RHR-388/626- 4' Bar 299	626/626
1	Cylinder	12E72(Std.)RP 626	626
1	Exit Device	CD-35A-EO-626-965 x 2135 Door -LHR- 299	626
2	Cylinder	1E74(Std.)C4RP3 626	626
		* Cylinder dogging. Supplier to confirm cam requirements	
3	Construction Core	7145333 (7p)	
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
2	Surface Closer	4040XP LONG (Top Jamb) 689	689
2	Mounting Plate	4040XP-18G 689	689
2	Overhead Door Stop	104S US32D	US32D
1	Perimeter Weatherstrip	By Door Supplier	
1	Threshold	CT-808 x 72"	
2	Threshold Stop	CT-40S x 38"	
2	Door Sweep	W-24S-CA x 38"	CA
1	Mullion Seal	5100N-86"	

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Heading #7

1 Pair of doors 008a, Vestibule 008 From Corridor 002

RHRA

965, 863 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
2	Horizontal Push Bar	GSH 5000-2 C32D # 4B * confirm length with door supplier	US32D
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
2	Surface Closer	4040XP LONG (Top Jamb) 689	689
2	Mounting Plate	4040XP-18G 689	689
2	Overhead Door Stop	104S US32D	US32D

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Heading #8

1 Pair of doors 010, Exterior From Vestibule 007

LHRA

965, 965 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
1	Electric Strike	6111-630	630
1	Removable Mullion	4854-83"-RH-689- 154	689
1	Exit Device	CD-35A-NL-OP-626-965 x 2135 Door -LHR-388/626- 4' Bar	626/626
1	Cylinder	12E72(Std.)RP 626	626
1	Exit Device	CD-35A-EO-626-965 x 2135 Door -RHR- 4' Bar 299	626
2	Cylinder	1E74(Std.)C4RP3 626	626
	* Cylinder dogging. Supplier to confirm cam requirements		
4	Construction Core	7145333 (7p)	
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
1	Auto Operator	HA-8 (push) c/w extended spindle CLA	CLA
1	Relay	CX-33	
2	Actuator	CM-60/2	
2	Escutcheon	CM-89S	
1	Surface Closer	4040XP LONG (Top Jamb) 689	689
1	Mounting Plate	4040XP-18G 689	689
2	Overhead Door Stop	104S US32D	US32D
1	Perimeter Weatherstrip	By Door Supplier	
1	Threshold	CT-808 x 72"	
2	Threshold Stop	CT-40S x 38"	
2	Door Sweep	W-24S-CA x 38"	CA
1	Mullion Seal	5100N-86"	
1	Key Switch	960N-MA x 28	28
1	Cylinder	1E74(Std.)C4RP3 (Keyswitch) 626	626

* All required power, conduit and back boxes are by Electrician

* Keyswitch mounted on frame and intended to turn off outside actuator at lock up

** Mode Of Operation --

- Exit devices can be dogged open when required and exit / entrance is by pushing or pulling door to open OR pushing either side actuator to begin operator cycle.
- Keyswitch to turn off outside actuator at lock up
- Inside actuator to momentarily open electric strike and begin operator cycle at all times even during "lock-up"

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Heading #9

1 Pair of doors 010a, Vestibule 010 From Corridor 009

LHRA

965, 965 x 2135 x ___ - AL DR x AL FR

1	Continuous Hinge	780-112 HD 83" Clear LHR	Clear
1	Continuous Hinge	780-112 HD 83" Clear RHR	Clear
2	Horizontal Push Bar	GSH 5000-2 C32D # 4B	US32D
		* Supplier to confirm length required with door supplier	
2	Door Pull	GSH 1180-2 C32D # 4B	US32D
1	Auto Operator	HA-8 (push) c/w extended spindle CLA	CLA
2	Actuator	CM-60/2	
2	Escutcheon	CM-89S	
1	Surface Closer	4040XP LONG (Top Jamb) 689	689
1	Mounting Plate	4040XP-18G 689	689
2	Overhead Door Stop	104S US32D	US32D

* All required power, conduit and back boxes are by Electrician

** Mode Of Operation --

- Pushing either side actuator begins operator cycle at all times

Heading #10

1 Single door 101, Corridor 002 To Storage 101

LH

965 x 2135 x 45 - HM DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 D 15 C S3 626	626
1	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #11

1 Single door 102, Corridor 002 To Custodian

LH

965 x 2135 x 45 - HM DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 D 15 C S3 626	626
1	Construction Core	7145333 (7p)	
1	Surface Closer	4040XP REGARM 689 45	689
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #12

1 Single door 103, Corridor 002 To IT Room

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 D 15 C S3 626	626
1	Construction Core	7145333 (7p)	
1	Surface Closer	4040XP REGARM 689 45	689
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #13

1 Single door 104a, Corridor 002 To Mech. 104a

LH

965 x 2135 x 45 - HM DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 D 15 C S3 626	626
1	Construction Core	7145333 (7p)	
1	Surface Closer	4040XP REGARM 689 45	689
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #14

1 Single door 104b, Mech. 104a To Elect. 104B

LH

965 x 2135 x 45 - HM DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 D 15 C S3 626	626
1	Construction Core	7145333 (7p)	
1	Surface Closer	4040XP REGARM 689 45	689
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #15

1 Single door 105, Corridor 002 To Boys WC. 105

LH

965 x 2135 x 45 - HM DR x PS FR

1	Continuous Hinge	780-224 HD 83" Clear LH	Clear
1	Push Plate	GSH 81A C32D (5" x 20") TM	US32D
1	Door Pull	GSH 4009-1 C32D # 2 45	US32D
1	Auto Operator	HA-8 (pull) CLA	CLA
2	Actuator	CM-60/2	
2	Escutcheon	CM-89S	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Mop Plate	GSH 80A C32D (4" x 37") TM	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

* All required power, conduit and back boxes are by Electrician

** Mode Of Operation

- Pushing either side actuator begins operator cycle at all times

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Heading #16

1 Single door 106, Corridor 002 To Girls WC. 106

RH

915 x 2135 x 45 - HM DR x PS FR

1	Continuous Hinge	780-224 HD 83" Clear RH	Clear
1	Push Plate	GSH 81A C32D (5" x 20") TM	US32D
1	Door Pull	GSH 4009-1 C32D # 2 45	US32D
1	Auto Operator	HA-8 (pull) CLA	CLA
2	Actuator	CM-60/2	
2	Escutcheon	CM-89S	
1	Kick Plate	GSH 80A C32D (8" x 34 1/2") TM	US32D
1	Mop Plate	GSH 80A C32D (4" x 35") TM	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

* All required power, conduit and back boxes are by Electrician

** Mode Of Operation

- Pushing either side actuator begins operator cycle at all times

Heading #17

1 Single door 107, Corridor 004 To WC 107

LH

965 x 2135 x 45 - HM DR x PS FR

1	Continuous Hinge	780-224 HD 83" Clear LH	Clear
1	Privacy Lockset	9K 3 (LC) 0 L 15 C S3 626	626
1	Surface Closer	4040XP REGARM 689 45	689
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Mop Plate	GSH 80A C32D (4" x 37") TM	US32D
1	Wall Door Stop	GSH 250 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #18

1 Single door 108, Corridor 004 To UNI. WC 108

LH

965 x 2135 x 45 - HM DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Electric Strike	CX-ED2079 (Fail Safe)	
1	Lockset	9K 3 (Std.) 7 D 15 C S3 626	626
1	Construction Core	7145333 (7p)	
1	Auto Operator	HA-8 (pull) CLA	CLA
1	UV / WR Control Kit	CX-WC13AXFM CX-TRX-5024	
1	Power Supply	CX-PS13V3	
1	Emergency Call Kit	CX-WEC10	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Mop Plate	GSH 80A C32D (4" x 37") TM	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

* All required power, conduit and back boxes are by Electrician

Heading #19

1 Single door 109a, Corridor 004 To Spec. Ed. 109a

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #20

1 Single door 109b, Spec. Ed. 109a To WC 109B

RH

965 x 1200 x 45 - SCW DR x PS FR

2	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Passage Set	9K 3 (LC) 0 N 15 C S3 626	626
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #21

1 Single door 110, Corridor 004 To Resource 110

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #22

1 Single door 111, Corridor 004 From General Purpose 111

RHR

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	NRP-FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Mop Plate	GSH 80A C32D (8" x 37") TM * Pull Side	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #23

1 Single door 111a, Corridor 004 From General Purpose 111

LHR

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	NRP-FBB168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Mop Plate	GSH 80A C32D (8" x 37") TM	US32D
		* Pull Side	
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #24

1 Single door 112, Corridor 004 To Classroom 112

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBB168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #25

1 Single door 113, Corridor 004 To Resource 113

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #26

1 Single door 114, Corridor 007 To Boys WC. 114

RH

965 x 2135 x 45 - SCW DR x PS FR

1	Continuous Hinge	780-224 HD 83" Clear RH	Clear
1	Push Plate	GSH 81A C32D (5" x 20") TM	US32D
1	Door Pull	GSH 4009-1 C32D # 2 45	US32D
1	Auto Operator	HA-8 (pull) CLA	CLA
2	Actuator	CM-60/2	
2	Escutcheon	CM-89S	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Mop Plate	GSH 80A C32D (4" x 37") TM	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

* All required power, conduit and back boxes are by Electrician

** Mode Of Operation

- Pushing either side actuator begins operator cycle at all times

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Heading #27

1 Single door 115, Corridor 007 To Girls WC 115

LH

965 x 2135 x 45 - HM DR x PS FR

1	Continuous Hinge	780-224 HD 83" Clear LH	Clear
1	Push Plate	GSH 81A C32D (5" x 20") TM	US32D
1	Door Pull	GSH 4009-1 C32D # 2 45	US32D
1	Auto Operator	HA-8 (pull) CLA	CLA
2	Actuator	CM-60/2	
2	Escutcheon	CM-89S	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Mop Plate	GSH 80A C32D (4" x 37") TM	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

* All required power, conduit and back boxes are by Electrician

** Mode Of Operation

- Pushing either side actuator begins operator cycle at all times

Heading #28

1 Single door 116, Corridor 009 To Classroom 116

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #29

1 Single door 117, Corridor 009 To Classroom 117

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #30

1 Single door 118, Corridor 009 To Classroom 118

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #31

1 Single door 119, Corridor 009 To Music 119

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #32

1 Single door 120, Corridor 009 To Classroom 120

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBB168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #33

1 Single door 121, Corridor 009 To Classroom 121

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBB168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #34

1 Single door 122, Corridor 009 To Classroom 122

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #35

1 Single door 123, Corridor 009 To Classroom 123

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #36

1 Single door 124, Corridor 009 To Classroom 124

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #37

1 Single door 125, Corridor 009 To Classroom 125

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #38

1 Single door 126, Corridor 004 To Classroom 126

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #39

1 Single door 127, Corridor 004 To Classroom 127

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #40

1 Single door 128, Corridor 004 To Kindergarten 128

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #41

1 Single door 128b, Kindergarten 128 To WC 128B

LH

965 x 1200 x 45 - SCW DR x PS FR

2	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Passage Set	9K 3 (LC) 0 N 15 C S3 626	626
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #42

1 Single door 129, Corridor 004 To Kindergarten 128

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #43

1 Single door 129b, Kindergarten 128 To WC 129B

RH

965 x 2135 x 45 - SCW DR x PS FR

2	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Passage Set	9K 3 (LC) 0 N 15 C S3 626	626
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

* Architect Note - Confirm door size

Heading #44

1 Single door 130, Corridor 005 To Kindergarten 131

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Heading #45

1 Single door 130b, Kindergarten 130 To WC 130B

LH

865 x 1200 x 45 - SCW DR x PS FR

2	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Passage Set	9K 3 (LC) 0 N 15 C S3 626	626
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #46

1 Single door 131, Corridor 005 To Kindergarten 131

LH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #47

1 Single door 131b, Kindergarten 131 To WC 131B

LH

865 x 1200 x 45 - SCW DR x PS FR

2	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Passage Set	9K 3 (LC) 0 N 15 C S3 626	626
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

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Submittal Date: December 3, 2025

Heading #48

1 Single door 132, Corridor 005 To Kindergarten 132

RH

965 x 2135 x 45 - SCW DR x PS FR

3	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Lockset	9K 3 (Std.) 7 IN 15 C S3 626	626
2	Construction Core	7145333 (7p)	
1	Kick Plate	GSH 80A C32D (8" x 36 1/2") MS	US32D
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Heading #49

1 Single door 132b, Kindergarten 132 To WC 132B

RH

865 x 1200 x 45 - SCW DR x PS FR

2	Standard Hinge	FBF168 (4 1/2" x 4) US26D	US26D
1	Passage Set	9K 3 (LC) 0 N 15 C S3 626	626
1	Wall Door Stop	GSH 240 C26D	US26D
3	Door Silencer	SR64 GRY	GRY

Cambridge Public School
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PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Architectural Woodwork.
- .2 Metal Doors and Frames
- .3 Aluminum Doors and Frames
- .4 Glazed Aluminum Curtain Walls

1.2 GENERAL

- .1 Glazing System (including/tested with Aluminum Doors and Frames System, and Aluminum Doors and Frames) is to meet or exceed requirements of SB-10 of the Ontario Building Code.
- .2 Contractor to submit in writing, certification and test results that the proposed systems, meet or exceed requirements of SB-10 of the Ontario Building Code.

1.3 REFERENCES

- .1 ASHRAE/IES 90.1-1989
- .2 ANSI/ASHRAE/USGBC/IES 189.1-2009
- .3 ASTM International
 - .1 ASTM C 542-05, Standard Specification for Lock-Strip Gaskets.
 - .2 ASTM D 790-07e1, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - .3 ASTM D 1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.
 - .4 ASTM D 1929-96(R2001)e1, Standard Test Method for Determining Ignition Temperature of Plastics.
 - .5 ASTM D 2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
 - .6 ASTM E 84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .7 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .8 ASTM F 1233-08, Standard Test Method for Security Glazing Materials and Systems.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
 - .4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.
 - .5 CAN/CGSB-12.6-M91, Transparent (One-Way) Mirrors.
 - .6 CAN/CGSB-12.8-97, Insulating Glass Units.
 - .7 CAN/CGSB-12.8-97 (Amendment), Insulating Glass Units.
 - .8 CAN/CGSB-12.9-M91, Spandrel Glass.
 - .9 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.
 - .10 CAN/CGSB-12.11-M90, Wired Safety Glass.
 - .11 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets.
 - .12 CAN/CGSB-12.13-M91, Patterned Glass.
- .5 Glass Association of North American (GANA)
 - .1 GANA Glazing Manual - 2008.

- .2 GANA Laminated Glazing Reference Manual - 2009.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit samples for review and acceptance of each unit.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for glazing for incorporation into manual.

1.6 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Mock-ups: Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect glazing and frames from nicks, scratches, and blemishes.
 - .3 Protect prefinished aluminum surfaces with wrapping.
 - .4 Replace defective or damaged materials with new.

1.8 AMBIENT CONDITIONS

- .1 Ambient Requirements:
 - .1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.
 - .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.9 WARRANTY

- .1 From the date of Certificate of Substantial Performance, the insulating glass units shall be warranted for a period of five (5) years against vision obstruction due to the formation of dust or

film on the internal surfaces, caused by the failure of the hermetic seal other than through glass breakage.

- .2 Replace when so directed by the Architect, within the said periods, any and all portions of work which fail to perform according to the requirements of these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Design Criteria:
 - .1 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials. Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to design pressure designated for the geographical location of the project to ASTM E330.
 - .3 Limit glass deflection to 1/200 with full recovery of glazing materials.
- .2 Tempered glass: to CAN/CGSB-12.1-M90 Type 2, Class B, Category 11, 6 mm and 10 mm thickness.
 - .1 Thickness for display cases:
 - .1 Display case shelving shall be minimum 6 mm thick
 - .2 Display case glazing shall be laminated safety glass.
sliding glass: 6 mm thick
fixed glass: 10mm thick
 - .2 Acceptable Material: AFG Glass Inc., Concord, Ont., for items .1 and .2 above.
- .3 Clear sheet glass: to CAN/CGSB-12.2,A quality.
- .4 Polished plate or Float glass: to CAN/CGSB-12.3, glazing quality, 6 mm thick. For locations and sizes, see also millwork drawings and Door Schedule.
- .5 Fire-rated Glass:
 - .1 Install in 45 minute fire rated pressed metal frame and door. Fill frame with grout.
 - .2 Acceptable material: 45 min rated FireLite Plus, laminated, thickness 8mm, as manufactured by Technical Glass Products, Milton, Ontario or approved equivalent.
- .6 Insulating glass units:
 - .1 For windows and curtain wall system:
 - .1 Typical sealed glazed unit (total thickness 25mm):

Outer pane:	6 mm thick clear tempered glass to CAN/CGSB-12.4-M91
Cavity:	13mm, Air 5%/ Argon 95%/ Warm edge spacers
Inner pane:	6 mm thick tempered glass to CAN/CGSB-12.4-M91 -Low E coating on to located on third surface SolarBan 60
 - .2 Opaque spandrel glass: Opaque spandrel glazing to CAN2-12.9, Duranar DTG coating by the Coating and Resins Group - PPG Industries, applied to 6 mm thick, heat strengthened, float glass. Coating colour to be selected from manufacturer's full range of colours.

2.2 GLAZING AND SEALING COMPOUND MATERIALS

- .1 Only compounds listed on the CGSB Qualified Sealing Compound Products List are acceptable for use on this project.
 - .1 Glazing sealant: one part polysulphide to CAN/CGSB-19.13-M87 or one part silicone to CAN/CGSB-19.18-M87.
 - .2 Glazing tape: preshimmed polyisobutylene: Polyshim by Tremco. 10-15 durometer hardness, paper release, black.
 - .3 Glazing gasket: Tremco Vision Strip; colour selected by Architect.

2.3 ACCESSORIES

- .1 Setting blocks: neoprene, 80-90 Shore A durometer hardness to ASTM D 2240, minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height 6mm.
- .2 Spacer shims: neoprene, 80 Shore A durometer hardness to ASTM D 2240, 75 mm long x 2.4mm thick x 9mm high. Self adhesive on one face.
- .3 Glazing points and wire spring clips: corrosion resistant, manufacturer's standard.
- .4 Primer-sealers and cleaners: to glass manufacturer's standard.

2.4 FIRE RATED ASSEMBLIES

- .1 Provide and install Fire-rated glass in all doors and frames located in a fire separation. Lines of fire separations are shown on drawings.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- .1 Remove protective coatings and clean contact surfaces with solvent and wipe dry
- .2 Apply primer-sealer to contact surfaces.
- .3 Place setting blocks as per manufacturer's instructions.
- .4 Install glass, rest on setting blocks, ensure full contact and adhesion at perimeter.
- .5 Install removable stops, without displacing tape or sealant.
- .6 Provide edge clearance of 3 mm minimum.
- .7 Insert spacer shims to centre glass in space. Place shims at 600 mm oc and keep 6 mm below sight line.
- .8 Apply cap bead of the specified TREMCO sealant at exterior void.
- .9 Apply sealant to uniform and level line, flush with sightline and tooled or wiped with solvent to smooth appearance.
- .10 Do not cut or abrade tempered, heat treated or coated glass.

3.2 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.
 - .1 Verify that openings for glazing are correctly sized and within tolerance.
 - .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
 - .3 Visually inspect substrate in presence of Consultant.
 - .4 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .5 Proceed with installation only after unacceptable conditions have been remedied.

3.3 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION: EXTERIOR - DRY METHOD (TAPE/TAPE AND SEALANT)

- .1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.
- .3 Cut glazing tape to proper length and set against permanent stops 5 mm below sight line. Install horizontal strips first, extend over entire width of opening before applying vertical strips. Weld corners together by butting tape and dabbing with sealant.
- .4 Place glazing tape on glass in manner described above.
- .5 Drain infiltrated moisture to exterior through drain holes in sill.
- .6 Install locking strip and gasket assembly to manufacturer's instructions.
- .7 Trim protruding tape edge.

3.5 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)

- .1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- .3 Place setting blocks at 1/3 points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
- .5 Place glazing tape on free perimeter of glazing in same manner described.

- .6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .7 Knife trim protruding tape.

3.6 FINISHING

- .1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .1 Remove traces of primer, caulking.
 - .2 Remove glazing materials from finish surfaces.
 - .3 Remove labels.
 - .4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
- .2 Clean glass just prior to and immediately after installation. Remove glazers' dirt and stains, then wash and polish all surfaces and leave thoroughly clean
- .3 Install insect screens after final cleaning by General Contractor.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.8 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 After installation, mark each light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.
- .3 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Do work in accordance with CSA A82.31-M1980 and the C.G.C. Gypsum Construction Handbook Latest Edition, except where specified otherwise.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C 475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C 514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.
 - .3 ASTM C 557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .4 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.
 - .5 ASTM C 954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .6 ASTM C 1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .7 ASTM C 1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .8 ASTM C 1280-99, Standard Specification for Application of Gypsum Sheathing.
 - .9 ASTM C 1177/C 1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .10 ASTM C 1178/C 1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
 - .11 ASTM C 1396/C 1396M-09a, Standard Specification for Gypsum Wallboard.
- .2 Association of the Wall and Ceilings Industries International (AWCI): AWCI Levels of Gypsum Board Finish-97.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .4 Underwriters' Laboratories of Canada (ULC): CAN/ULC-S102-07, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Provide shop drawings for the metal framing for suspended ceilings and bulkheads.
 - .2 Clearly indicate layout and dimensions, member sizes, profiles and thicknesses, connection details, fastening methods, and other pertinent information.
 - .3 The ceiling and bulkhead framing, including all related connections and fastenings, shall be designed by a structural engineer permanently licensed to practice in the Province of

Ontario. Each shop drawing shall bear the stamp and signature of the aforesaid structural engineer.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store gypsum board assemblies materials level, off ground, indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
 - .3 Protect from weather, elements and damage from construction operations.
 - .4 Handle gypsum boards to prevent damage to edges, ends or surfaces.
 - .5 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
 - .6 Replace defective or damaged materials with new.

1.5 AMBIENT CONDITIONS

- .1 Maintain temperature 10 degrees C minimum, 21 degrees C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.6 FIRE RATED CONSTRUCTION

- .1 Provide wall and ceiling assemblies for fire rated partitions, and floor or roof assemblies to ULC test designs and National Building Code Fire performance Requirements indicated on drawings.

1.7 DESIGN CRITERIA

- .1 Design the suspended ceiling and bulkhead framing to be attached to and supported by the structure above.
- .2 The suspension system shall be capable of safely supporting the weight of all items which are designed to be supported by it, including, but not limited to:
 - .1 Light fixtures
 - .2 Diffusers
 - .3 Other items supported by the ceiling system.
- .3 Be advised that light fixtures will not be provided with separate support.
- .4 Design the suspension system to withstand normal and seismic loads.
- .5 Maximum deflection: 1/360 of span to ASTM C635 deflection test.

PART 2 - PRODUCTS

2.1 GENERAL ACCEPTANCE

- .1 For materials manufactured by CGC and listed in this specification section, equivalents can be proposed as manufactured by CertainTeed and Georgia-Pacific.

2.2 GYPSUM BOARD PANELS

- .1 Interior: abuse resistant paper faced gypsum core panel to CSA A82.27-M91, Type X, 16 mm thick as indicated on drawings, 1200 mm wide by maximum practical lengths, ends square cut, edges tapered with round edges.
- .2 Cement board for application at roof curbs: Duracrete exterior cement board: 12.7 mm thick, 1200 mm x 2400 mm as manufactured by C.G.C.
- .3 For canopies and Exterior Wall Assemblies (outer layer): Dens Glass Gold, 16mm thick, 1200mm x 2400mm.

2.3 METAL FURRING AND SUSPENSION SYSTEMS

- .1 Metal Furring Runners 0.87 mm (20 gauge), Hangers, Tie Wires, Inserts, Anchors: to CSA A82.30-M1980, hot dipped, galvanized.
- .2 Resilient Channels and Furring Channels: 0.87 mm (20 gauge) core thickness galvanized steel channels for screw attachment of all kinds of gypsum boards specified herein.

2.4 FASTENINGS AND ADHESIVES

- .1 Nails and Screws: to CSA A82.31-M1980, Type S, bugle head, fine thread, rust-resistant, sharp point drywall screw for light gauge metal framing or furring. Type S-12, bugle head, fine thread, rust-resistant, drill point drywall screw for heavy gauge (12-22 gauge) steel framing. Screws for exterior application shall be zinc coated or stainless steel.
- .2 Stud adhesive: to CAN/CGSB-71.25-M88.
- .3 Laminating compound as recommended by manufacturer.
- .4 Contact cement: premium grade.

2.5 JOINT TREATMENT MATERIAL

- .1 For Interior Use:
 - .1 Joint tape: 50 mm wide, high strength cross fibre paper tape for reinforcing joints, as manufactured by C.G.C. Inc.
 - .2 Joint compound: ready-mixed all-purpose drywall compound as manufactured by C.G.C. Inc.
- .2 For Exterior Use (Soffits):
 - .1 Joint tape for Dens-Glass Gold: 50 mm wide, 10 x 10 wove glass mesh joint tape.
 - .2 Joint compound for Dens-Glass Gold: horizontal surfaces, G.P. gypsum "Speed Set 90" as manufactured by Georgia Pacific.
- .3 For Exterior Use (Vertical Surfaces):

- .1 Joint tape: 50 mm wide, 10 x 10 woven glass mesh joint tape
- .2 Joint finishing sealant: Dow Corning T95 building sealant, Tremco Dymonic.

2.6 ACCESSORIES

- .1 Casing Beads, Corner Beads, Control Joints: 26 gauge galvanized steel, as manufactured by The Canadian Gypsum Company:
 - .1 Casing Beads: C.G.C.-200B, the use of "J" trims is not permitted
 - .2 Corner Beads: No. 114, C.G.C Dur-A-BEAD.
 - .3 Control Joints: C.G.C. Control Joint # 093.
 - .4 Column Rings: At all round concrete columns (refer to drawings for quantities) intersecting with gypsum board bulkheads, provide shadow mould column rings. Rings equal to model CRR 144 as manufactured by C.G.C. Inc. All exposed surfaces of rings to be prefinished to match acoustical ceiling suspension system components.
 - .5 Edge mouldings and trims: Metal or extruded aluminum of types and profiles indicated. Provide flexible and fixed reveal shadow mouldings at all locations indicated. Reveal trim equal to model D-300 as manufactured by Bailey Metal Products Ltd.
- .2 Acoustic Sealant: to CAN/CGSB-19.21-M87. Sealants acceptable for use on this project must be listed on CGSB Qualified Product List issued by CGSB Qualification Panel for Joint Sealants.
- .3 Polyethylene: to CAN/CGSB-51GP-51M, Type 2.
- .4 Insulating Strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one (1) face; lengths as required.
- .5 Sound Attenuation Batts: 76 mm, friction fit, semi-rigid, mineral wool insulation with fire hazard classification of: flame spread 15, fuel contributed 0, and smoke developed 0. Acceptable material: Acoustical Fire Batt as manufactured by Roxul.
- .6 Fire Stopping Material: "Fire-Stop" as manufactured by AA/D Distributors.
- .7 Adhesive for Trim Accessories: "premium grade" contact cement.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 SUSPENDED AND FURRED CEILINGS AND BULKHEADS

- .1 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with CSA A82.31-M1980 except where specified otherwise.
- .2 Install work level to tolerance of 1:1200.
- .3 4 mm (9 gauge) hangers shall be spaced not over 1200 mm for interior applications, and not over 900 mm for exterior applications, in the direction of the 33 mm main runner channels and not over 1200 mm for interior applications, and not over 900 mm for exterior applications in the direction

- at right angles to the main runners, and within 150 mm of the ends of main runner runs and of boundary walls or similar interruptions of ceiling continuity. Secure hangers to u/s of over head steel structure. It is NOT PERMISSIBLE to attach hangers or channels from the steel deck. Where it is not possible to attach to steel structure, provide additional supports hung from steel structure.
- .4 Main runners shall be placed not over 1200 mm oc for internal applications, and maximum 900 mm oc for exterior applications, properly positioned, levelled, and hangers shall be saddle tied along runner.
 - .5 Main runners shall not be let into nor come in contact with abutting walls. Runner channels shall be located within 150 mm, 6" of the walls to support the ends of the furring channels.
 - .6 Except where shown otherwise, metal furring channels shall be spaced 450 mm oc for internal application and 300 mm oc for exterior application. Metal furring channels shall be securely clipped with furring channel clips or saddle tied with two (2) strands of 16 gauge tie wire to main runners or main support members and shall not be let into or come in contact with abutting masonry walls.
 - .7 End splices shall be provided by nesting channels or studs no less than 200 mm and securely attached with wire.
 - .8 Metal furring channel clips shall be installed on alternate sides of the main runner channel. Wire tie metal furring channel to 38 mm channel and to main support members when clips cannot be alternated.
 - .9 At light fixtures or any openings that interrupt the main runner or channels, reinforce grillage with 19 mm cold rolled channels, wire tied atop and parallel to the main runner channels. Provide gypsum board boxing over fixtures or other devices to maintain fire resistance rating of one (1) hour. Size boxing of recessed light fixtures to meet fixture manufacturer's requirements for dissipation of heat.
 - .10 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
 - .11 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
 - .12 Install 22 x 68 mm C.G.C. furring channels parallel to, and at exact locations of steel stud partition header track.
 - .13 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings. Vertical furring shall be braced type wherever possible. Where bracing is impractical, furring shall be sized to suit the condition prevailing.
 - .14 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

3.3 INSTALLATION OF SOUND ATTENUATION BATTS

- .1 Provide sound attenuation batts in **all interior walls**.

3.4 GYPSUM BOARD APPLICATION (INTERIOR)

- .1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are reviewed by the Architect.

- .2 The use of crimpers shall be not permitted on this project.
- .3 Apply 12 mm diameter bead of acoustic sealant continuously around perimeter of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, etc., in partitions where perimeter is sealed with acoustical sealant.
- .4 Install acoustic fibrous material in all metal stud partitions both above and below the ceiling to achieve minimum STC 45 rating for partition.
- .5 Install specified layers of the specified wallboard to steel studs as indicated.
- .6 Apply the specified number of layers of gypsum wallboard over steel studs:
 - .1 one (1) layer: vertically
 - .2 two (2) layers: first layer horizontally, second layer vertically
- .7 Gypsum wallboard shall be screwed at 300 mm on centres at a maximum in the field of the board and 200 mm, 8" on centres along the vertical abutting edges.
- .8 Use 31.7 mm (1-1/4") screws for one (1) layer of wallboard; 63.4 mm (2-1/2") screws for two (2) layers of wallboard:
 - .1 first layer: apply with screws as specified in para .7 above
 - .2 second layer: laminate over first layer using the specified compound
- .9 Install sound attenuation batts as specified herein at all interior partitions, and elsewhere Specified herein or shown on the drawings. Press in tightly and staple to the back side of one (1) face of the partition.
- .10 Joints on opposite sides of the partition shall occur on different studs. Cut wallboard neatly to fit around all interruptions.
- .11 Install sealant at the perimeter and on both sides of all walls and at all interruptions.
- .12 All visible internal and external angles formed by the intersection of either wallboard surfaces or other surfaces shall be treated with vinyl trims, as specified herein and as indicated.
- .13 Carry all partitions to underside of concrete structure. Pack all gaps between deck and top of partitions with the specified sound attenuation batts. Use ULC approved fire stopping material for walls which are required to provide a smoke barrier or fire rating.
- .14 All abutting end or edge joints shall occur over the web surface of the furring channel and shall be fitted neatly and accurately with end joints staggered.
- .15 Gypsum wallboard shall be properly supported around all cutouts and openings in the ceiling.
- .16 Install casing beads around perimeter of suspended ceilings.
- .17 For diffusers and access panels see mechanical specifications and mechanical drawings for details to be complied with.
- .18 Install wire mesh in walls between Library and Teacher=s Lounge as per O.B.C. 4.1.10.3.

3.5 ACCESSORIES

- .1 Erect accessories straight, 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, and

free of rough edges.

- .2 Install metal corner beads on external angles.
- .3 Install metal casing beads around perimeter of suspended ceilings.
- .4 Install metal casing beads where gypsum board butts against surfaces which have no trim to conceal the junction, and where indicated. Seal joints with sealant.
- .5 Install insulating strips continuously at edges of gypsum board or casing beads abutting metal window or exterior door frames, to provide thermal break.
- .6 Install metal casing beads where gypsum board butts dissimilar material.

3.6 ACCESS DOORS

- .1 Install access doors to electrical or mechanical fixtures specified in respective Sections.
- .2 Rigidly secure frames to furring or framing system.

3.7 TRIM

- .1 Minimize joints; use corner pieces as specified herein.

3.8 INSTALLATION OF GYPSUM WALLBOARD TREATMENT JOINT TREATMENT

- .1 All junctions of wallboard panels shall be taped and filled in accordance with the following:
 - .1 Joint compounds shall be mixed in accordance with manufacturer's instructions and CSA A82.31-M1980.
 - .2 Prefill abutting rounded edges of eased edge gypsum wallboard with pre-fill compound. Leave a depression for tape.
 - .3 Apply the specified reinforced tape; embed it in joint compound and fold it and embed it in all angles to provide a true angle.
 - .4 A filling coat shall be applied over the embedding coat to fill board tapers flush with the wallboard surface. On joints with no taper the fill coat shall cover the tape and feather out at least 100 mm on either side of the tape.
 - .5 A finishing coat shall be applied to the fill coat and feathered to a smooth uniform finish.
 - .6 To provide a smooth surface, sanding shall occur between coats and following the final application of compound.

3.9 CONTROL JOINTS

- .1 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .2 Provide continuous polyethylene dust barrier behind and across control joints.
- .3 For interior work, locate control joints at changes in substrate construction at approximate 10m spacing on walls, at approximate 15 m spacing on ceilings.
- .4 For exterior work, locate control joints as per manufacturer's recommendations.
- .5 Install control joints straight and true.

3.10 PATCHING AND MAKING GOOD

- .1 Patch and make good new surfaces cut, damaged or disturbed, to Architect's approval.
- .2 Making good shall extend beyond the immediate limits of the disturbed surfaces to ensure the imperceptible continuity of existing décor.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Ontario Building Code (latest edition).
- .2 National Building Code of Canada (latest edition)
- .3 CAN3-S136, Cold Formed Steel Structural Members.
- .4 CSA-W47.1, Certification of Companies for Fusion Welding of Steel Structures
- .5 CSA-W59, Welded Steel Construction (Metal Arc Welding)
- .6 CAN-CGSB, 1-GP-181M Standard for: Coating, Zinc Rich, Organic Ready Mix

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C 645-00, Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C 754-00, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Canadian General Standards Board (CGSB): CAN/CGSB-1.40-97, Primer, Structural Steel, Oil Alkyd Type.

1.3 FIRE RATED CONSTRUCTION

- .1 Provide wall assemblies for fire rated partitions to ULC test designs.

1.4 DESIGN CRITERIA FOR EXTERIOR WALL STEEL CHANNEL STUD FRAMING AND AT EXTERIOR CANOPIES

- .1 The Design for the entire wall system and anchoring to the building structure shall be based principles using factored loads and resistances.
- .2 Loads and load factors shall be in accordance with the National Building Code of Canada.
- .3 Resistances and resistance factors shall be determined in accordance with the National Building Code and CAN3-S136.
- .4 Conform to the requirements of specified fire rated assemblies.
- .5 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Sheathing shall not be used to help restrain member rotation and translation perpendicular to the minor axis for: wind bearing studs.
- .6 Maximum deflections under specified loads shall be L/600.
- .7 Design components or assemblies to accommodate specified erection tolerances of the structure.
- .8 The spacing of member shall not exceed 400mm o.c.
- .9 Allow for movement of the building structure. Design wind bearing stud end connections to accommodate roof deflections such that the studs are not loaded axially.
- .10 Connections between stud framing members shall be by bolts, welding or sheet metal screws.
- .11 Resistances for sheet metal screw shall be based on the manufacturer's lower bound test values

multiplied by the appropriate resistance factor, given in CAN3-S136.

- .12 Allow for appropriate end eccentricities in the design of axial load bearing members.

1.5 SUBMITTALS

- .1 Submit representative pieces of all framing component parts including mechanical fasteners if used. The length of pieces submitted need not exceed 300 mm. Tag pieces with the name of the part, the metal thickness exclusive of coating and the manufacturer.
- .2 Submit 3 copies of engineering calculations or data verifying the capacity of the members and the ability of the assemblies to meet the design requirements.
- .3 Submit shop drawings in accordance with Section 01 33 00:
- .1 Each shop drawing submitted shall bear the stamp and signature of a qualified Professional Engineer and registered in the Province of Ontario. The metal stud systems contractor shall retain the services of a Professional Structural Engineer for the Project and pay for engineering services in connection with shop drawings and review during construction of the metal stud systems.
- .2 Include all necessary shop details and erection diagrams. Indicate member sizes, locations, thicknesses exclusive of coating, coatings and materials. Include connection details for attaching framing to itself and for attachment to the structure. Show splice details where permitted. Indicate dimension, openings, requirement of related work and critical installation procedures. Show temporary bracing required for erection purposes.
- .3 Indicate design loads.
- .4 Do not fabricate until all submittals are reviewed by Consultant. Submit 3 copies of field review reports from the Systems Contractors Structural Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 EXTERIOR WALL CHANNEL STUD FRAMING: to ASTM C645-81; stud side 152 mm deep; roll formed from minimum 18 gauge thickness electro-galvanized sheet steel; for screw attachment of cementitious sheathing board and gypsum board and steel girth. Knock out service holes at 460 mm centres.
- .2 EXTERIOR STUD WALL FLOOR TRACKS: to ASTM C645-81, in widths to suit stud sizes. 50 mm + flange height, to suit individual conditions. Gauge and finish to match exterior wall channel stud framing.
- .3 EXTERIOR STUD WALL TOP TRACKS: to ASTM C645-8, in width to suit stud sizes complete with long legged inner and outer top track to accommodate deflection of the building structure. Screwed top track deflection as per Baley Construction Detail No. 1. Gauge and finish to match wall stud framing.
- .4 NON-LOADBEARING CHANNEL STUD FRAMING FOR INTERIOR USE: to ASTM C645-81; 92 mm and 152 mm deep x 0.53 mm thick; roll formed from electrogalvanized steel sheet, for screw attachment of gypsum board. Knock out service holes at 460 mm centres.
- .5 NON-LOADBEARING CHANNEL STUD FRAMING FOR INTERIOR USE WITH ABUSE RESISTANT GYPSUM BOARD: to ASTM C645-81; 92 mm and 152 mm deep x 0.9 mm thick; roll formed from electrogalvanized steel sheet, for screw attachment of gypsum board. Knock out service holes at 460 mm centres

- .6 FLOOR AND TOP TRACKS FOR INTERIOR STUD WALLS: to ASTM C645-81; in widths to suit stud sizes, minimum 40 mm flange height. Top tracks for partitions located below steel roof or floor structures shall be deflection tracks which allow maximum 25 mm deflection of building structure.
- .7 METAL CHANNEL STIFFENER FOR STUD WALLS: 2 mm thick by minimum 38 mm wide cold rolled steel, coated with rust inhibitive coating.
- .8 SHAFT WALL CONSTRUCTION: C-H metal studs and Type S drywall screws. Refer to shaft wall construction in Section 09250.
- .9 ACOUSTICAL SEALANT: to CGSB 19-GP-21M.
- .10 INSULATING STRIP: rubberized, moisture resistant 3 mm thick neoprene strip, 12 mm wide, with self-sticking adhesive on one (1) face, lengths as required.
- .11 SCREWS AND FASTENINGS FOR STUD WALL SYSTEM: purpose-made to suit application, to CSA-A82.31-M1980, Type S, shall be zinc coated, stainless steel for exterior stud wall system.

PART 3 - EXECUTION

3.1 ERECTION OF NON LOAD BEARING CHANNEL STUD FRAMING FOR INTERIOR USE

- .1 Align partition tracks at floor and underside of metal deck and concrete structure and secure at 400 mm o.c. maximum.
- .2 Place studs vertically at 400 mm o.c. 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.
- .3 Erect metal studding to tolerance of 1:1000.
- .4 Attach studs to bottom and top track or as detailed on drawings, using screws or crimp pop rivets.
- .5 Coordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .6 Coordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .7 Provide two (2) or more studs extending from floor to ceiling at each side of openings wider than stud centres specified or as shown on drawings. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .8 Provide one row of continuous horizontal of stiffener for all interior stud walls. At partitions over 3500 mm (12'-0") high provide two (2) rows. There upon provide one additional row of horizontal stiffener for every 1500 mm (5'0") height of partition.
- .9 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's printed instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .10 Provide 40 mm stud or furring channel and wood blocking as required secured between studs for attachment of millwork, fixtures, etc., and other items including wall stops for doors, towel rails,

etc., attached to steel stud partitions.

- .11 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .12 Extend partitions to underside metal deck and/or concrete except where noted otherwise.
- .13 Maintain clearance under steel structure to avoid transmission of structural loads to studs. Use 50 mm leg top tracks with stud connections at these locations to allow for movement. Refer to drawings for additional details.
- .14 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .15 Install two (2) continuous beads of sealant behind studs and tracks around perimeter of all partitions.
- .16 Extend studs vertically and tie to structure to provide lateral stability.
- .17 Provide diagonal bracing above ceilings as required to meet design criteria.

Frame all openings in fire rated partitions, inclusive of mechanical and electrical Channel openings, to ULC-G21, Figures 4, 5, 6, 7, 8 for and 15, ULC CR 1255, Figures 1 and 2, and ULC Certification Bulletin #80-5.

3.2 ERECTION OF EXTERIOR WALL STEEL CHANNEL STUD FRAMING

- .1 Erection Tolerances:
 - .1 For the purposes of this section, camber is defined as the deviation from straightness of a member or any portion of a member with respect to its major axis, and sweep is defined as the deviation from straightness of a member or any portion of a member with respect to its minor axis.
 - .2 Straightness shall not exceed 1/1000 th of the member length.
 - .3 For exterior steel studs, out of plumbness shall not exceed 1/500 th of the member length. Out of straightness (camber and sweep) shall not exceed 1/100 th of the member length.
 - .4 For track, camber shall not exceed 1/1000 th of the member length.
 - .5 Studs shall seat into top and bottom tracks. The gap between the end of the stud and the web of the track shall not exceed 1.5 mm for axial load bearing studs or 4 mm for wind bearing studs.
 - .6 Spacing of studs shall not be more than 3 mm from the design spacing. The cumulative error in spacing shall not exceed the requirements of the finishing materials.
- .2 Make all field measurement necessary to insure the proper fit of all members.
- .3 Cutting of members may be by saw or shear. Exterior wall steel torch cutting is not permitted.
- .4 Insulation equal to that specified shall be placed in all jamb and header assemblies that will be inaccessible after their installation into the wall. Insure that insulation is kept dry and not compressed.

3.3 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Do tile work in accordance with Installation Manual 200-1979,"Ceramic Tile", produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
 - .2 CTI A118.3-92, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
 - .3 CTI A118.4-92, Specification for Latex Cement Mortar (included in ANSI A108.1).
 - .4 CTI A118.5-92, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
 - .5 CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1).
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 144-04, Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C 207-06, Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C 847-06, Specification for Metal Lath.
 - .4 ASTM C 979-05, Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-75.1-M88, Tile, Ceramic.
 - .4 CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .2 CAN/CSA-A3000-03(R2006), Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Specification Guide 09 30 00 2006/2007, Tile Installation Manual.
 - .2 Tile Maintenance Guide 2000.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance Submittals: Manufacturer's Instructions, manufacturer's installation instructions.

1.5 AMBIENT CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.
- .2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

1.6 MAINTENANCE

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide minimum 2% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material same production run as installed material.

1.7 QUALIFICATION

- .1 Ceramic tile work shall be carried out by a member of the Terrazzo, Tile and Marble Association of Canada.

1.8 PROTECTION

- .1 Finished work shall be protected from usage and damage by other trades until setting beds have cured.

PART 2 - PRODUCTS

2.1 FLOOR TILE

- .1 Ceramic tile: to CAN/CGSB-75.1-M88, Type 4, Class MR2, cushion edges, **slip resistant**, colour as selected by Architect. Acceptable Material: Spectra series by Olympia Tile, size 300 x 300mm, colour Anthracite (**CT**)
- .2 All floor tile to be installed with 150mm ceramic floor base from the same series ceramic tile.

2.2 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .3 Internal and External Corners: provide trim shapes as follows where indicated.
 - .1 Bullnose shapes for external corners including edges.
 - .2 Coved shapes for internal corners.
 - .3 Special shapes for:
 - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.
 - .2 Base to floor external corners to provide bullnose vertical edge with integral

- coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.
- .3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.
- .4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.

2.3 MORTAR AND ADHESIVE MATERIALS

- .1 Cement: to CSA-A5, type 10.
- .2 Sand: to ASTM C 144, passing 16 mesh.
- .3 Hydrated lime: to ASTM C 207, Type N NA S SA.
- .4 Latex Thin Set Additive shall be Laticrete No.4237 manufactured by Laticrete International.
- .5 Additive for Bond Coat shall be Laticrete No. 3701 and for Grout shall be Latapoxy SP100 stainless grout and adhesive manufactured by Laticrete International Inc.
- .6 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- .7 Dry Set Mortar shall conform to ANSI A118.1-1985 and CGSB-71GP-30M, Type 2. Acceptable material: Laticrete 3701 everywhere, except at shower areas use Laticrete 4237.

2.4 GROUT

- .1 Portland cement grout and acrylic latex additive: preparation shall conform to manufacturer's specifications. Acceptable material: Keracolor by Mapei or Laticrete grout or Colour Max by Flextile.

2.5 ACCESSORIES

- .1 At top of ceramic base use anodized aluminum, Jolly by Schluter Systems Inc.
- .2 At intersections of ceramic floor and resilient tile floors use anodized aluminum, Schiene by Schluter Systems Inc.
- .3 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm fiber mesh, in flat sheets.
- .4 Divider strips: Aluminum or Zinc, complete with anchors, both sides spaced at 150 mm on centre.
- .5 Cleavage plane: polyethylene film to CGSB 51-34.
- .6 Metal lath: to ASTM C 847 galvanized finish, 10 mm rib at 2.17 kg/m².
- .7 Transition Strips: purpose made metal extrusion; anodized aluminum type.
- .8 Reducer Strips: purpose made metal extrusion; anodized aluminum type; maximum slope of 1:2.
- .9 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .10 Sealant: in accordance with Section 07 92 00 - Joint Sealants..
- .11 Floor sealer and protective coating: to CAN/CGSB-25.20, to tile and grout manufacturers

recommendations.

2.6 MIXES

- .1 Cement:
 - .1 Scratch coat: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, and latex additive where required. Adjust water volume depending on water content of sand.
 - .2 Slurry bond coat: cement and water mixed to creamy paste. Latex additive may be included.
 - .3 Mortar bed for floors: 1 part cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
 - .4 Mortar bed for walls and ceilings: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
 - .5 Levelling coat: 1 part cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
 - .6 Bond or setting coat: 1 part cement, 1/3 part hydrated lime, 1 part water.
 - .7 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Mix bond and levelling coats, and grout to manufacturer's instructions.
- .4 Adjust water volumes to suit water content of sand.

2.7 PATCHING AND LEVELLING COMPOUND

- .1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
 - .1 Compressive strength - 25 MPa.
 - .2 Tensile strength - 7 MPa.
 - .3 Flexural strength - 7 MPa.
 - .4 Density - 1.9.
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

2.8 CLEANING COMPOUNDS

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

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 APPLICATION - THIN SET MORTAR METHOD

- .1 Tiles shall be applied by a thin set mortar method to all masonry walls and concrete floors unless indicated otherwise.
- .2 Clean dust, loose mortar, plaster, cement, grease, and other foreign material from all surfaces to receive tiles.
- .3 Dampen surfaces uniformly with water.
- .4 The mortar setting bed for the tile shall not exceed 3 mm. Areas that require a float coat shall have a water resistant mortar prepared and applied as follows. Prepare a sand and cement mortar using 1:2 dilution of thin set additive and water to make a plastic trowelling mix. Trowel in place to a plumb, true surface and allow to set.
- .5 To make thin set mortar, mix thin set additive with Portland Cement and sand in a clean container or mortar box to obtain a heavy trowelling consistency. Comply with additive manufacturer's specifications for mixing.
- .6 Apply thin set mortar with a notched trowel. Use sufficient mortar to bed the tile completely. The tile shall be applied while the mortar surface is wet and tacky. As work progresses align and rub or beat tiles with a block to embed tile mortar and assure a true surface.
- .7 Apply grout mix and work into joint. Use a stiff brush, trowel, or sponge float. All joints shall be completely filled; leave no voids. Remove excess grout with a squeegee or trowel. Joints of tiles shall be 1.6 mm wide, uniform in width, plumb, straight, true, and surfaces shall be flush across joints. Maximum surface tolerance 1:800.
- .8 Lay out tiles so that perimeter tiles are minimum 3/4 size.
- .9 Cut tiles neatly around all interruptions.
- .10 Install matching trim tiles as specified herein at all perimeters of work or at changes in plane. Recess base as indicated on drawings.

3.3 WORKMANSHIP

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, "Ceramic Tile", except where specified otherwise.
- .2 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .3 Maximum surface tolerance 1:800.
- .4 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .5 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .6 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .7 Make internal angles square, external angles rounded.

- .8 Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .9 Install divider strips at junction of tile flooring and dissimilar materials.
- .10 Allow minimum 24 hours after installation of tiles, before grouting.
- .11 Clean installed tile surfaces after installation and grouting cured.

3.4 FLOOR SEALER AND PROTECTIVE COATING

- .1 Apply in accordance with manufacturer's instructions.

3.5 CLEANING

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

END OF SECTION

PART 1- GENERAL

1.1 RELATED WORK

- .1 Section 09 53 00 Acoustic Suspension.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E 1264-98, Standard Classification for Acoustical Ceiling Products.
 - .3 ASTM E 1477-98a(2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 1988.
 - .2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .3 Canadian Standards Association (CSA International): CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS): Material Safety Data Sheets (MSDS).
- .5 Underwriter's Laboratories of Canada (ULC): CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples of each type acoustical units.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements: Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Protect on site stored or installed absorptive material from moisture damage.
- .2 Store extra materials required for maintenance, where directed by Owner.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20-40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

1.7 EXTRA MATERIALS

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Deliver to Owner, upon completion of the work of this section.

1.8 EXAMINATION

- .1 Examine all items on which the installation depends and ensure that there are no defects. Ensure that all mechanical, electrical, or other equipment that has to be installed before commencing of work is in place.

1.9 CERTIFICATION OF SUSPENSION SYSTEM

- .1 Provide and pay for structural engineering and design for the suspension system.
- .2 Maximum deflection: 1 / 360th of span to ASTM C3635 deflection test.
- .3 The design of the suspension system and anchoring to the building structure shall be based on the principles using factored loads and seismic restraints in accordance w/ the 2006 OBC and the user's guide NBC 2005 structural commentary. Submit shop drawings stamped by Engineer licensed in the Province of Ontario.
- .4 Resistances and resistance factors shall be determined in accordance with the 2006 OBC and CAN/CSA S136.
- .5 Contractor to submit a letter stamped by Engineer licensed in the Province of Ontario, inspecting and certifying the Suspension System.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Lay-in Acoustic Tile:
 - .1 Acoustic tile Type 1 shall be moulded mineral fibre tile, fire rated, 16 mm thick and 610 mm x 1220 mm. Acceptable Material: Baroque Mineral Fiber Ceiling – PBT-197, as manufactured by CertainTeed.

PART 3- EXECUTION

3.1 EXAMINATION

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.

3.2 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Ensure substrate surface is level to 1:1000
- .3 In fire rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

3.3 APPLICATION

- .1 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width. Refer to reflected ceiling plan.
- .2 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.4 INTERFACE WITH OTHER WORK

- .1 Co-ordinate with Section 09 53 00 - Acoustical Suspension.
- .2 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

END OF SECTION

PART 1- GENERAL

1.1 EXAMINATION

- .1 Examine all drawings, notes on drawings and items on which the installation depends. Ensure that all mechanical, electrical, or other equipment that has to be installed before commencement of the work is in place.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C 635/C 635M-07, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .2 ASTM C 636/C 636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for acoustical suspension for incorporation into manual.

1.5 QUALITY ASSURANCE

- .1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

1.7 CERTIFICATION OF SUSPENSION SYSTEM

- .1 Provide and pay for structural engineering and design for the suspension system.
- .2 Maximum deflection: 1 / 360th of span to ASTM C3635 deflection test.
- .3 The design of the suspension system and anchoring to the building structure shall be based on the principles using factored loads and seismic restraints in accordance w/ the 2024 OBC and the user's guide NBC 2005 structural commentary. Submit shop drawings stamped by Engineer licensed in the Province of Ontario.
- .4 Resistances and resistance factors shall be determined in accordance with the 2024 OBC and CAN/CSA S136.

- .5 Contractor to submit a letter stamped by Engineer licensed in the Province of Ontario, inspecting and certifying the Suspension System.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

- .1 Design Requirements: maximum deflection: 1/360th of span to ASTM C 635/ASTM C635M deflection test.

2.2 MATERIALS

- .1 Components: all main beams and cross tees shall be commercial quality hot dipped galvanized steel as per ASTM A 653. main beams and cross tees are double-web steel construction with 15/16 type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
 - .1 Structural Classification: ASTM C 635 Intermediate Duty.
 - .2 Colour: White and to match the actual colour of the selected ceiling tile, unless noted otherwise.
 - .3 Acceptable Products:
 - .1 Fire Rated, two directional 25 mm (15/16") exposed tee-bar grid system for acoustic tiles:
 - .1 Acceptable Manufacturers:
 - .1 Certain Teed Ceilings, 15/16" Classic, Fire Rated, or equivalent.
- .2 Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- .3 Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, prestretched, with a yield stress load of at least time three design load, but not less than 12 gauge.
- .4 Edge Mouldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard Mouldings for edges and penetrations, including light fixtures that fit type of edge detail and suspension system indicated. Provide flexible and fixed reveal shadow moulding with exposed flange of the same width as exposed runner.
- .5 Accessories: splices, hold down clips, wire ties, retainers and wall moulding reveal, to complement suspension system components, as recommended by system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for acoustical ceiling tile and track installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

- .2 Installation: to ASTM C 636/C 636M except where specified otherwise.
- .3 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.
- .4 Do not erect ceiling suspension system until work above ceiling has been inspected and approved by Consultant.
- .5 Secure hangers to overhead structure using attachment methods acceptable to Consultant. It is **NOT PERMITTED** to attach hangers or similar fasteners to the steel deck or concrete beams. X-ray hollow core roof prior to installation of hangers.
- .6 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .7 Lay out system according to reflected ceiling plan.
- .8 Ensure suspension system is co-ordinated with location of related components.
- .9 Support at light fixtures diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .10 Interlock cross member to main runner to provide rigid assembly.
- .11 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .12 Install access splines to provide 50% ceiling access.
- .13 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .14 Where it is not possible by direct suspension to support the ceiling grid or other components in the ceiling assembly as specified, provide a secondary suspension system to support the required ceiling hangers
- .15 Expansion joints:
 - .1 Erect two main runners parallel, 50 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, 25% narrower than space between 2 'T' bars.
 - .2 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day.
- .2 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .3 Clean exposed trim, edge moulding, shadow moulding and suspension members.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by acoustical suspension installation.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM F 1066-04, Standard Specification for Vinyl Composition Floor Tile.
 - .2 ASTM F 1344-04, Standard Specification for Rubber Floor Tile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-95, Surface Sealer for Floors.
 - .2 CAN/CGSB-25.21-95, Detergent-Resistant Floor Polish.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS): Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and for 48 hours after installation.

1.5 MAINTENANCE

- .1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 5% of each colour (or one full box, whichever is greater), pattern and type flooring material required for this project for maintenance use.
- .3 Extra materials from same production run as installed materials.
- .4 Identify each container of floor tile and each container of adhesive.
- .5 Deliver to Owner, upon completion of the work of this section.
- .6 Store where directed by Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Filler, Primer, and Adhesives: Type and brand recommended by the flooring materials manufacturer for applicable conditions. Adhesives shall be waterproof.
- .2 Vinyl Tile: In accordance with CSA Specification A-126-1-1984, Type A, plain and mottled. accepted manufacturer: Armstrong, product: Armstrong Excelon or equivalent product by Flextile. Tile shall be 3 mm thick, 300 x 300 mm size. Floor tile colours are as follows:
RFT-1 – 5934 Silk
RFT-2 – 57551 Perfect Storm
RFT-3 – 51929 Sandy Beach
- .3 Rubber Base: Johnsonite Dura Cove, 100 mm high x 3 mm thick rubber base. Base shall be coved. Colour: Silver Grey WG.
- .4 Transition strips, expansion/control joint trims/covers as per manufacturer's recommendations at all transitions of dissimilar material and control joints, or as indicated
- .5 Feature strips: of same material and thickness as adjacent work.
- .6 Sub-floor filler and leveller: as recommended by flooring manufacturer for use with their product.
- .7 Metal edge strips: aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .8 Sealer: to CAN/CGSB-25.20, Type 2-water based, recommended by flooring manufacturer.

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 INSPECTION

- .1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

3.3 SUBSTRATE TREATMENT

- .1 Remove existing resilient flooring.
- .2 Remove old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives (to Manufacturer's Recommendations).
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

- .5 Prime and Seal substrate to flooring manufacturer's printed instructions.

3.4 TILE APPLICATION

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.
- .2 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place. Ensure compatibility of adhesives with floor and wall surfaces.
- .3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .4 Install flooring to square grid pattern with joints aligned.
- .5 As installation progresses, and after installation, roll flooring in 2 directions with 45 kg minimum roller to ensure full adhesion or as per Manufacturer's written Recommendations.
- .6 Cut tile and fit neatly around fixed objects.
- .7 Install feature strips and floor markings where indicated. Fit joints tightly.
- .8 Install flooring in pan type floor access covers. Maintain floor pattern.
- .9 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .10 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .11 Install rubber base at all vertical surfaces in rooms called up to have rubber base by the Room Finish Schedule.
- .12 Joints in the rubber base shall be tight and no part of the joint shall exceed 1 mm in width. Joints shall occur no more frequently than every 1200 mm except where the vertical surface changes plane.
- .13 Provide rubber transition edging at junctions between resilient flooring and exposed or painted concrete floors.
- .14 At junctions with ceramic tile flooring and resilient sports flooring, use cementitious product feather subfloor to provide a flash finish between top of vinyl tile and top of ceramic tile floor finish. Apply feathered transition over a distance of 1200 mm minimum
- .15 Install metal edge strips at unprotected or exposed edges where flooring terminates.
- .16 Concrete shall be at least twenty-eight (28) days old before tile is applied.

3.5 APPLICATION: BASE

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.

- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.

3.6 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services: 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.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Remove excess adhesive from floor, base and wall surfaces without damage.
- .3 Clean, seal and wax floor and base surface to flooring manufacturer's instructions.

3.8 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Environmental Protection Agency (EPA): Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2 Do painting to CAN/CGSB-85-100-M81.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS): Material Safety Data Sheets (MSDS).
- .4 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - February 2004.
 - .2 Standard GPS-1-05, MPI Green Performance Standard for Painting and Coatings.
- .5 National Fire Code of Canada and Ontario Fire Code.
- .6 Society for Protective Coatings (SSPC): Systems and Specifications, SSPC Painting Manual 2005.

1.2 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .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.
 - .4 Conform to latest MPI requirements for exterior painting work including preparation and priming.
 - .5 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
 - .6 paint materials such as linseed oil, shellac, and turpentine 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.
 - .7 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Soffits: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 On request of the Architect submit sample "draw downs" sets of materials and colours proposed for use in the work. One set of each sample will be retained by the Architect for future comparison. Finished work shall be equal to samples.
- .3 When required, samples shall be made on the actual work in the building.

1.4 QUALITY CONTROL

- .1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 When requested by Consultant, prepare and paint designated surface, area, room or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.5 MAINTENANCE

- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Submit one, four litre can of each type and colour of primer, stain, finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.7 AMBIENT CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces.
 - .2 Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
 - .4 Co-ordinate use of existing ventilation system with Owner and ensure its operation during and after application of paint as required.
 - .5 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.
 - .6 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities to be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .4 Relative humidity is above 85 % or when dew point is less than 3 degrees C variance between air/surface temperature.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .2 Perform no painting work when maximum moisture content of substrate exceeds:
 - .1 12% for concrete and masonry (clay and concrete brick/block).
 - .2 15% for wood.

- .3 12% for plaster and gypsum board.
- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
- .4 Test concrete, masonry 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 noted herein.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
 - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
 - .5 Do not apply paint when:
 - .1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
 - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
 - .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
 - .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
 - .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Owner such that painted surfaces will have dried and cured sufficiently before occupants are affected.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.
- .2 The Products of generally only one (1) manufacturer shall be used on the project and the Architect shall be notified of the proposed products to be used prior to delivery of the materials to the site.
- .3 Acceptable Materials shall be
 - .1 Over new surfaces:
 - .1 Benjamin Moore Advance Waterborne Interior Alkyd Paint 792, Pearl finish.
 - .2 Benjamin Moore Advance Waterborne Interior Alkyd Paint 793, Semi-gloss finish.
 - .3 DuluxXpert Interior Waterborne Alkyd Paint, 22010, Melamine finish.
 - .4 DuluxXpert Interior Waterborne Alkyd Paint, 21010, Semi-gloss finish.
 - .5 Para: premium Hybrid waterborne alkyd.
 - .6 Sherwin-Williams: Promar 200 waterborne alkyd.
 - .2 Latex primer over new gypsum board surfaces:
 - .1 Dulux Ultrahide 36600 or equivalent Benjamin Moore, Para and Sherwin Williams primer sealer.

- .3 Oil to Latex conversion primer, over existing surfaces:
 - .1 B-I-N Shellac-Base Primer Sealer by Zinsser – assume all existing paint is oil base.
- .4 Over new concrete block surfaces: Block filler to CAN/CGSB-1.188-M90.
- .4 Provide paint products meeting MPI “Environmentally Friendly” E1, E2, E3 ratings based on VOC (EPA Method 24) content levels.
- .5 Paint colours

PT-1 – Typical Wall Paint & Wood Door Frames – Benjamin Moore Cotton Balls 2145-70
PT-2 – Accent Wall Paint – Benjamin Moore Blue Hydrangea 2062-60
PT-3 – Hollow Metal Door and Frames – Benjamin Moore Smoke Gray 2120-40
All metal door and frames to be semi-gloss finish

2.2 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Consultant's written permission.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.3 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 noted on Finish Schedule.

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 Exterior repainting work: inspected by Contractor. Painting contractor to notify Consultant minimum of one week prior to commencement of work and provide copy of project repainting specification and Finish Schedule.
- .2 Exterior surfaces requiring repainting: inspected by Contractor who will notify Consultant in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .3 Where assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.
- .4 Where "special" repainting or recoating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer to provide as part of work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Owner.

3.3 STORAGE

- .1 Store paint materials in areas assigned for the purpose. Ventilate well and take all fire safety precautions. Keep containers closed.
- .2 Keep all paint materials in unopened, original containers which are sealed and labelled.
- .3 Packaged items which require inside protection shall be stored in a warm, dry area within the building.
- .4 All soiled or used rags and waste shall be removed from the building every night.

3.4 PREPARATION

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and 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 it to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.
 - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
 - .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
- .4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances

in accordance with MPI requirements. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

- .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

3.5 EXISTING CONDITIONS

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Consultant. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Stucco: 12%.
 - .2 Concrete: 12%.
 - .3 Clay and Concrete Block/Brick: 12%.
 - .4 Wood: 15%.

3.6 PROTECTION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such 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.
- .4 Protect passing pedestrians, building occupants, and general public in and about building.
- .5 Remove light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.
- .6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Consultant.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise specified, paint ALL exterior exposed conduits, piping, hangers, duct work and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise. Do not paint inside mechanical cabinets.

- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Do not paint over nameplates.
- .4 Fire protection piping shall be red 509-102 in accordance with CAN/CGSB 60.1-M89.
- .5 Natural gas piping shall be yellow 505-101 in accordance with CAN/CGSB 60.1-M89.
- .6 Keep sprinkler heads free of paint.
- .7 Paint inside of ductwork where visible with primer and one coat of matt black paint.
- .8 Paint both sides and edges of plywood backboards for equipment before installation. Leave equipment in original finish except for touch-ups as required. Do not paint over name plates.
- .9 Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.

3.8 EXTENT OF EXTERIOR PAINTING

- .1 All items which are not prefinished and which are installed at the exterior of the building shall be painted.
- .2 All exterior mechanical and electrical equipment, inclusive of exposed pipes, conduits, and duct work, shall be painted.
- .3 All miscellaneous metal items shall be painted.

3.9 EXTENT OF INTERIOR PAINTING

- .1 As indicated in Room Finish Schedule, drawings and specifications.
- .2 All interior mechanical and electrical equipment, inclusive of exposed pipes and ducts, shall be painted.

3.10 SURFACE PREPARATION

- .1 General:
 - .1 Surfaces shall be carefully cleaned. Remove all oil, ridges and unevenness
 - .2 Surfaces shall be dry.
- .2 Plaster and Drywall:
 - .1 Plaster shall be thoroughly cured. Prepare to CAN/CGSB-85.100-93. Fill minor cracks with plaster patching compound.
 - .2 Gypsum wall board shall be properly finished, patched, taped and sanded smooth, by the drywall contractor, prior to painting. All surface dust shall be removed to enhance adhesion.
- .3 Wood:
 - .1 Prepare to CAN/CGSB-85.100-93. Putty all holes, cracks, joints and other defects and sand smooth. Sand lightly between all coats. Knots, sap and pitch in wood shall be stopped with two (2) coats of shellac before priming.

- .4 Concrete Block and Concrete Surfaces:
 - .1 Prepare to CAN/CGSB-85.100-93. Wire brush off loose particles and dust.
- .5 Ferrous Surfaces:
 - .1 Remove dirt and grease with benzine. Remove runs and defective prime paint down to bare metal and touch up with CGSB 1-GP-40M to CGSB 85-GP-14M.
- .6 Galvanized Steel (including but not limited to exposed roof deck and exposed ductwork):
 - .1 Prepare galvanized and zinc coated surfaces to CGSB 85-GP-16M. Prime with metal conditioner which conforms to CGSB 1-GP-121M. After ten (10) minutes wash with clean water. Mild steel shall be primed with red lead primer.
- .7 Concrete Floors:
 - .1 Prepare to CGSB 85-GP-32M.
- .8 Plastic/Vinyl/PVC:
 - .1 After removing all surface contaminants, the surface shall be scuff sanded or scrubbed with an abrasive cleaner to dull the surface for best adhesion. Prime with PrepRite Bonding Primer B51W50 as manufactured by Sherwin Williams.

3.11 APPLICATION

- .1 Paint colours shall be in accordance with the colour schedule prepared by the Architect at a later date.
- .2 The different surfaces in any one (1) room will not necessarily be one (1) colour. Millwork, doors, walls, and other elements within rooms shall be painted with different strong accent colours. The total number of strong accent colours in the project shall be limited to three (3). A total of three (3) basic wall colours shall be used. Doors shall be painted a different colour from door frame. Doors shall be a different colour from walls. Radiator covers shall be painted in strong accent colours.
- .3 In the Room Finish Schedule, where surfaces in rooms are specified to be painted, all elements fixed to those surfaces including frames of openings, doors, radiators, exposed new metal surfaces, shall be painted unless otherwise specified. Paint behind radiator covers.
- .4 In the Room Finish Schedule, where surfaces in rooms are specified to be painted, all elements fixed to those surfaces including frames of openings, doors, radiators, exposed new metal surfaces, shall be painted unless otherwise specified. Paint behind radiator covers.
- .5 Apply each coat at the proper consistency in accordance with the manufacturer's directions.
- .6 Sand lightly between coats when enamel or varnish is applied to wood or metal.
- .7 Regardless of the number of coats specified for any surface, apply sufficient number of extra coats of paint to produce a solid, uniform appearance and coverage in the opinion of the Architect.
- .8 Paint shall be applied by brush and roller. Reduce paint materials in strict accordance with the manufacturer's directions.
- .9 Top and bottom edges of doors shall receive the same finish as the face of the door.
- .10 New Gypsum Board:
 - .1 One (1) coat of primer-sealer to CAN/CGSB-1-119-2000
 - .2 Two (2) coats of Acrylic egg shell finish.

- .11 Concrete Block and Poured Concrete Walls:
 - .1 Two (2) coats of block filler to CAN/CGSB-1.188-96
 - .2 Three (3) coats of Waterborne Alkyd semi-gloss finish.
- .12 Galvanized and Zinc Coated Metal, doors, frames, railings, misc. steel, pipes, overhead decking and ducts:
 - .1 Two (2) coats of Waterborne Alkyd satin finish.
- .13 Interior Woodwork:
 - .1 On surfaces designated for painting, wood doors, trim, etc.:
 - .1 One (1) coat of undercoat to CAN/CGSB-1.38-2000
 - .2 Two (2) coats of semi-gloss Waterborne Alkyd to CAN/CGSB-1.57-96
- .14 Interior of Ductwork:
 - .1 On interior of ductwork visible through grilles or diffusers:
 - .1 One (1) coat matt black conforming to CAN/CGSB-1.114-M91
 - .2 May be spray applied.

3.12 FIELD QUALITY CONTROL

- .1 Inspection: 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.

3.13 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.14 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 Aluminum Association (AA): DAF 45-03, Designation System for Aluminum Finishes.
- .2 American National Standards Institute (ANSI).
 - .1 ANSI 208.1-79, Particleboard, Mat-formed Wood.
 - .2 ANSI A208.2-2002, Medium Density Fiberboard for Interior Use.
- .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A 653/A 653M-02a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A 924/A 924M-99, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .4 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-11.3-M87, Hardboard.
 - .2 CGSB 41-GP-30M-82, Wall coverings, Vinyl-Coated Fabrics.
- .5 Canadian Standards Association (CSA International).
 - .1 CSA O121-M1978(R1998), Douglas Fir Plywood.
 - .2 CSA O151-M1978(R1998), Canadian Softwood Plywood.
- .6 Porcelain Enamel Institute (PEI): PEI 501 Porcelain Enamel.
- .7 Underwriters' Laboratories of Canada (ULC):
 - .1 CAN/ULC-S706-02, Wood Fibre Thermal Insulation for Buildings.
 - .2 CAN/ULC-S102-M88(R2000), Surface Burning Characteristics of Building Materials and Assemblies.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate location, type, size, panel arrangement, backing, hardware, anchor or mounting details, frame or trim and accessories.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.3 WARRANTY

- .1 Provide a **five (5) year** written guarantee against faulty workmanship and materials.

PART 2- PRODUCTS

2.1 MATERIALS

- .1 White Boards:
 - .1 A factory lamination of porcelain enamelled 0.8 mm, 22-gauge steel, 11 mm (7/16") hardboard and a 0.48 mm, 26-gauge steel backing shall be surface mounted with aluminum trim.

- .2 Tackboards:
 - .1 6 mm cork, 6 mm particle board backing, and surface mounted with aluminum trim to Architect's selection from the manufacturer's standard colour range.
 - .2 Cork shall meet applicable code requirements for flame spread rating and smoke developed.
- .3 Aluminum Trim:
 - .1 Aluminum Trim shall be 38 mm (1-1/2") wide screw-on aluminum with extruded sections. Provide a full width tubular chalk tray for all white boards. Provide a full width, 50 mm (2") extruded aluminum display rail, complete with Krommenie cork insert over all white boards. Display rail shall be continuous over abutting whiteboards.
- .4 Aluminum Trim Finishes:
 - .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes – 1980.
 - .1 Clear anodic finish: designation AA-M12-C22-A31.
 - .2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative shall meet requirements of CGSB 63-GP-2M+Amdt-Jul-80, for coating Classes 1, 2 and 3 respectively.
- .5 Accessories:
 - .1 At each whiteboard length of 2400 mm (8'-0") or less provide:
 - .1 two (2) end stops
 - .2 Marker tray; Architectural School Products, Aluminum Series 200, length of whiteboard, connected with 2 or more consecutive boards, complete with end caps.
- .6 Unless shown otherwise tackboards and white boards shall be 1200 mm (4'-0") high by length shown on drawings.
- .7 Joint reinforcement: concealed mechanical jointing system to provide straight, rigid, continuously supported, tight butt, flush joints at surface.
- .8 Anchor clips, brackets and fasteners: concealed type recommended by manufacturer for fixed mounting.

2.2 ACCEPTABLE MANUFACTURERS

- .1 Architectural School Products Ltd
- .2 Global School Products
- .3 Clark Office Products Inc.
- .4 Modern

2.3 FABRICATION

- .1 Fabricate whiteboards and tackboards panels to sizes indicated.
- .2 Factory laminate whiteboards. Adhesive in accordance with manufacturers recommendations.
- .3 Make finished panels flat and rigid and fit with joint reinforcement.
- .4 Fit joints between abutting whiteboards/tackboards panels with joint reinforcement except where

covering trim is required.

- .5 Install trim on panels in factory. Make mitres and joints to hair-line fit, free of rough edges. Use concealed brackets to reinforce and hold joints tight and flush. No exposed fasteners permitted.
- .6 Overlap trim 6 mm onto panels. Provide closed ends for chalk-troughs and open-end extrusions
- .7 Factory fit assemblies too large for shipment to site in one piece; disassemble for delivery and site assembly.

PART 3- EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install whiteboarded/tackboards in accordance with manufacturer's instructions, parallel to floor with uniform vertical surface, plumb and level, to provide rigid, secure writing surface.
- .2 Install trim and framing around whiteboarded/tackboards panels. Make mitres and joints to hair-line fit, free of rough edges. Use concealed brackets to reinforce and hold joints tight and flush. No exposed fasteners permitted. Overlap trim 6 mm onto panels.
- .3 Boards shall be secured in place at a maximum of 300 mm (12") on centres at the bottom of tackboards and white boards and at 500 mm (20") on centres elsewhere. **Do not use adhesives.**
- .4 Set tackboards and white boards plumb and true. Use concealed fastenings. Where whiteboards are greater than 2400 mm (8'-0") in width butt together with hairline joints.
- .5 Unless shown otherwise, tackboards and white boards shall be installed 900 mm (35 1/2") and 600 mm (2'-0") above finished floor for most locations. Reconfirm installation height with Architect prior to installation.
- .6 Mechanical Attachment:
 - .1 To concrete or solid masonry use lag screw and expansion bolts or screws and fibre plugs as appropriate for stresses involved.
 - .2 To hollow masonry use toggle bolts or equivalent.
 - .3 To wood or sheet metal use screws. Secure into framing members in stud walls.

3.3 FIELD QUALITY CONTROL

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.
- .2 Manufacturer's field services: 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.

3.4 PROTECTION

- .1 After installation of whiteboards and tackboards protect surfaces with paper or polyethylene until painting is complete.

3.5 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .3 Clean aluminum with damp rag and approved non-abrasive cleaner.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 General

1.1 SCOPE OF WORK

- .1 Supply and installation of identification signage for doors and rooms throughout the building.
- .2 Follow the Signage Installation Standards attached at the end of this Specification Section.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings showing sign sizes, letter, number and symbol styles and sizes, attachment locations, and installation instructions.

1.3 SAMPLES

- .1 Submit one sample of each type of sign to be provided.
- .2 Submit samples of all colour choices for signage plates.

PART 2 Products

2.1 MATERIALS

- .1 Signage Plate: Satin finish, flexible, two colour blended acrylic extruded sheet with cap and core permanently fused, 2.4 mm thickness. Colour to Architect's selection from manufacturer's full range. Example: New Hermes Limited, Gravoply.
- .2 Signage at Exit Stairs shall comply with 3.4.6.19 of the OBC.
- .3 Adhesive: Double-sided adhesive tape as recommended by signage plate manufacturer.
- .4 Screws: Stainless steel, Robertson round head.
- .5 Proprietary Fasteners: Expansion shields or inorganic plugs, recommended for purpose by manufacturer for substrate to be attached to.

PART 3 Execution

3.1 FABRICATION

- .1 Fabricate signage by engraving letters, numbers and symbols into signage plate.
- .2 All letters and numbers shall be "helvetica medium", upper and lower case. Upper case lettering and numbering shall be 25 mm high unless noted or indicated otherwise. All signs shall be 45 mm high minimum by length to suit letters and/or numbers. Signage at Exit Stairs shall comply with 3.4.6.19 of the OBC.
- .3 All pictogram symbols shall be as indicated or trade standard. Provide shop drawings for Architect approval.
- .4 Drill holes in signage plates for screw attachment as indicated. Oversize holes to allow for expansion.

3.2 INSTALLATION

- .1 All signs shall be adhesive attached. In addition, screw attach signs as indicated. Provide proprietary fasteners as required for positive anchorage.
- .2 Confirm all mounting locations with Architect on site prior to installation.

3.3 SIGNAGE SCHEDULE

- .1 Use Signage Schedule in conjunction with Issue for Construction base building drawings for door numbers and locations

Signage Schedule			
Door No.	Room Name	Sign Type	Notes
D105	Boys' W.C.	4	
D106	Girls' W.c.	2	
D107	W.C.	5	
D108	Universal W.C.	6	
D109b	Barrier-Free W.C.	6	
D114	Boy's W.C.	4	
D115	Girls W.C.	2	
D128b	W.C.	5	
D129b	W.C.	5	
D130b	W.C.	5	
D131b	W.C.	5	
D132b	W.C.	5	

Signage Installation Standards

General Notes

Contractor to verify & check all dimensions on site. All dimensions in millimeters unless otherwise noted.

All debris to be promptly removed from site in containers designed for such use.

Upon award, successful contractor to submit full size mock-ups.

Legend:

A.F.F.	- Above Finished Floor
ELEV.	- Elevation
EXT.	- Exterior
INT.	- Interior
TYP.	- Typical

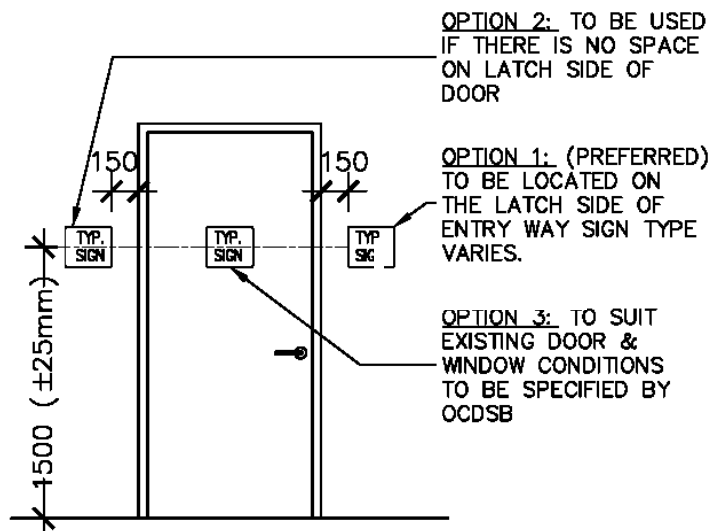
Signage Fabrication Notes

All sign background colours to be black, unless otherwise noted.

Installation Notes

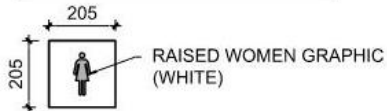
All exterior application installation of signs to be installed with a silicone adhesive.

Location of signage installation are to follow the diagram below, unless otherwise noted in the signage schedule.



INTERIOR SIGNAGE TYPES

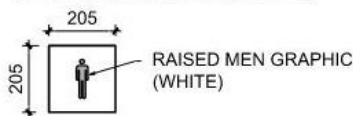
SIGN TYPE 1 - FEMALE WASHROOM



SIGN TYPE 2 - BARRIER-FREE FEMALE W.C.



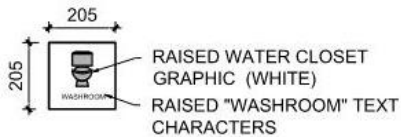
SIGN TYPE 3 - MALE WASHROOM



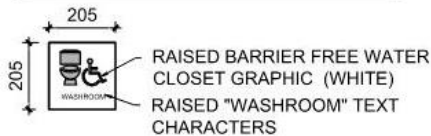
SIGN TYPE 4 - BARRIER-FREE MALE W.C.



SIGN TYPE 5 - UNISEX WASHROOM



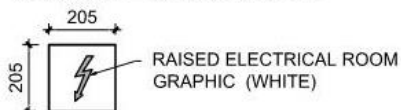
SIGN TYPE 6 - BARRIER-FREE WASHROOM



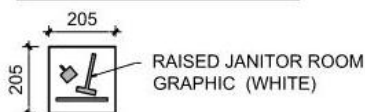
SIGN TYPE 7 - MECHANICAL ROOM



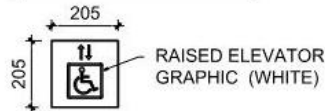
SIGN TYPE 8 - ELECTRICAL ROOM



SIGN TYPE 9 - JANITOR'S ROOM



SIGN TYPE 10 - ELEVATOR



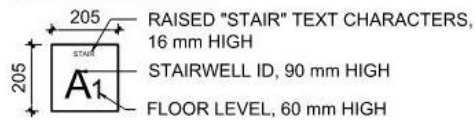
SIGN TYPE 11 - SHOWER ROOM



SIGN TYPE 12 - BARRIER-FREE SHOWER



SIGN TYPE 13 - STAIR

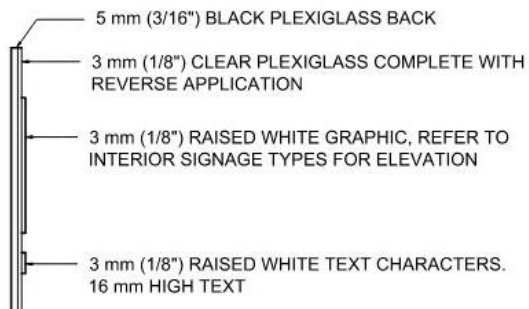


SIGN TYPE 14 - EXIT



NOTE: PER O.B.C. 3.4.5.2. (2024), TACTILE EXIT SIGNS ARE REQUIRED AT ALL EXIT DOORS FOR BUILDINGS THAT ARE
A) MORE THAN 2 STOREYS IN BUILDING HEIGHT,
B) AN OCCUPANT LOAD MORE THAN 150, OR
C) A ROOM OR FLOOR REQUIRES A FIRE ESCAPE AS A MEANS OF EGRESS

TYPICAL SIGNAGE SECTION



NOTE: FOR ALL SIGNAGE, THE GRAPHIC AND TEXT ARE TO BE CENTERED ON THE SIGN

Part 1 General

1.1 RELATED DOCUMENTS

- .1 Drawings and general provisions of the Contract, including Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY OF WORK

- .1 Work Included: The work of this Section includes the provision of all labour, materials, equipment and services required to fabricate and install site signage, as indicated on the drawings, as specified herein and as required for a complete project.
- .2 Related Work:
 - .1 Section 31 23 10 - Excavating, Trenching and Backfilling for Building.
 - .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling for Site Works.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM B209-10, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB-1.94-M89, Xylene Thinner (Xylol).
 - .3 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel.
 - .4 CAN/CGSB-1.132-M90, Zinc Chromate Primer, Low Moisture Sensitivity.
 - .5 CGSB 31-GP-101Ma-89, Chemical Conversion Films for Aluminum and Aluminum Alloys.
 - .6 CGSB 62-GP-9M-80, Prefabricated Markings, Positionable, Exterior, for Aircraft Ground Equipment and Facilities.
- .3 Canadian Standards Association (CSA):
 - .1 CSA-G40.20-04/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .4 City of Ottawa Fire Route Bylaw No. 2003-499.

1.4 SUBMITTALS

- .1 Shop Drawings: Clearly indicate the dimensions, layout and colours of each sign.
- .2 Samples:
 - .1 Submit a full-size sample sign fabricated from actual materials and finished in actual colours.
- .3 Product Data:
 - .1 Provide product data for the signs.
 - .2 Include installation instructions.

1.5 REGULATORY REQUIREMENTS

- .1 The work of this Section shall conform to the requirements of the City of Ottawa Fire Route Bylaw No. 2003-499, latest revision, and all other applicable codes and regulations, to the satisfaction of the authorities having jurisdiction.

Part 2 Products

2.1 MANUFACTURERS

- .1 This specification is based on exterior site signs by Western Signs.
- .2 Requests for substitutions will be considered.
Acceptance of alternative products is subject to the approval of the Consultant.

2.2 MATERIALS

- .1 Sign supports.
 - .1 Steel posts: to CAN/CSA-G40.21, 4 m long, flanged "U" shaped in cross section, measuring 65 mm wide by 30 mm deep. Metal thickness: 4.5 mm. Hot dipped galvanized to ASTM A-123, minimum zinc coating 600 g/m².
 - .2 Fasteners: bolts, nuts, washers and other hardware for signs to be galvanized steel.
- .2 Signboards
 - .1 Aluminum sheet: to ASTM B209, precut to required dimensions. Thickness: 2.1 mm.
 - .2 Paint materials:
 - .1 Xylene thinner: to CAN/CGSB-1.94.
 - .2 Chemical conversion coating for aluminum: to CGSB 31-GP-101Ma.
 - .3 Primer for aluminum: to CAN/CGSB-1.132.
 - .4 Finish paint: to CAN/CGSB-1.59.
 - .3 Signs to conform to City of Ottawa Standards, including Fire Route Bylaw No. 2003-499, as follows:
 - .1 Fire route signs – 1100 from grade to bottom of sign
 - .2 Bus Lan signs – 2200 from grade to bottom of sign.
 - .3 Barrier-free parking signs- 1100 from grade to bottom of sign
 - .4 Quantities and locations as indicated on the drawings.

2.3 FABRICATION

- .1 Aluminium blanks:
 - .1 Degrease, etch and bonderize with chemical conversion coating.
 - .2 Clean surfaces with xylene thinner. Dry.
 - .3 Spray sign face with one coat vinyl pre-treatment coating and two finish coats of required colour. Spray and bake face of signboards with two coats of enamel in accordance with CAN/CGSB-1.104.
- .2 Lettering and symbols: Cut from vinyl film as specified in CGSB 62-GP-9M, or paint using required colour of finish paint.
 - .1 Clean signboards completely and apply transparent tape over top edge and extending 25 mm minimum down back and front of signboard.
 - .2 Protect finished signboard faces with one coat of clear varnish.
- .3 Sign identification: Apply sign number and date of installation with 25 mm high black letters on lower left back face of each signboard.

Part 3 Execution

3.1 INSTALLATION

- .1 Sign support:
 - .1 Erect supports as indicated. Permissible tolerance: 25 mm maximum departure from vertical for direct buried supports.
 - .2 Erect posts plumb and square to details as indicated.
 - .1 Drive to required depth without damage to posts to min. depth of 600 mm
 - .2 If rock or concrete is encountered, drill hole to required depth and set post in sand.

- .2 Signboard: Securely fasten signboards to supporting posts with nuts, bolts and lock washers.

3.2 CORRECTION OF DEFECTS

- .1 Correct defects identified by the Consultant in the sign message, consistency of reflectivity, colour or illumination.
- .2 Correct the angle of the signboard and, where applicable, adjust the luminaire aiming angle for optimum performance during night conditions.

END OF SECTION

PART 1 General

1.1 RELATED WORK

- .1 Toilet and bath accessories Section 10 28 10

1.2 REFERENCES

- .1 CAN/CSA-B651-M90 Barrier-Free Design.

1.3 SHOP DRAWINGS

- .1 Submit required shop drawings.
- .2 Indicate fabrication details, plans, elevations, hardware, and installation details.

1.4 PROTECTION

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

1.5 EXAMINATION

- .1 Where partitions and stalls are to be installed, ensure that underlying work is acceptable. Commencement of work shall imply acceptance of conditions.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Powder coated steel, with honeycomb core.
- .2 Acceptable material: Bobrick 11540 Overhead Braced Classic Series, or equivalent by Hadrian, Watrous or Decolam.
- .3 Overhead brace: extruded aluminum channel with anti-grip anodized finish.
- .4 Pilaster shoe: all faces (4), minimum 75 mm high, 0.6 mm thick, stainless steel to ASTM A666-82.
- .5 Hardware:
 - .1 Slide bolt and keeper: chrome plated non-ferrous casting or extrusion, equipped for emergency access.
 - .2 Wall and connecting brackets: chrome plated, non-ferrous extrusion or casting.
 - .3 Fasteners: stainless steel tamperproof type screws and bolts.

- .4 Hinges: Continuous stainless steel hinge.

2.2 FABRICATION

- .1 Fabricate pilasters and partition panels of two sheets of zinc coated steel, laminated under pressure to a honeycomb core. Formed edges to be welded together and inter-locked under tension with a roll-formed oval crown locking bar, mitred, welded and ground smooth at the corners.
- .2 Partition panels shall be 25mm thick with cover sheets not less than 22 ga. Pilasters shall be 32mm thick with cover sheets not less than 20 ga.
- .3 Panels shall be approximately 1500 mm high.
- .4 Colour of partitions and pilaster panels: to Architect's later selection from manufacturer's standard range.

2.3 SHOP FINISHING

- .1 Clean, degrease and neutralize steel components with phosphate or chromate treatment.
- .2 Spray apply primer to CGSB 1-GP-81M, one (1) coat.
- .3 Spray apply finish enamel to CGSB 1-GP-104M, type 2, semi-gloss, one (1) coat and bake to smooth, hard finish.

PART 3 Execution

3.1 INSTALLATION

- .1 Do work in accordance with CAN/CSA-B651.

3.2 PARTITION ERECTION

- .1 Install partitions secure, plumb and square.
- .2 Leave 12 mm space between wall and panel or end pilaster.
- .3 Anchor fixing brackets to masonry concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors, to steel supports with bolts in threaded holes.
- .4 Attach panel and pilaster to brackets with through type sleeve bolt and nut.

END OF SECTION

Part 1 GENERAL

1.1 RELATED DOCUMENTS

- .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY OF WORK

- .1 This Section includes the following:
 - 1. Manually operated, paired panel operable partitions.
- .2 Related Sections include the following:
 - .1 Division 3 Sections for concrete tolerances required.
 - .2 Division 5 Sections for primary structural support, including pre-punching of support members by structural steel supplier per operable partition supplier's template.
 - .3 Division 6 Sections for wood framing and supports, and all blocking at head and jambs as required.
 - .4 Division 9 Sections for wall and ceiling framing at head and jambs.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .2 ASTM E557-12, Standard Guide for Architectural Design and Installation Practices for Sound Isolation between Spaces Separated by Operable Partitions.

1.4 QUALITY ASSURANCE

- .1 Installer Qualifications: An experienced installer who is certified in writing by the operable partition manufacturer, as qualified to install the manufacturer's partition systems for work similar in material, design, and extent to that indicated for this project.
- .2 Preparation of the opening shall conform to the criteria set forth in ASTM E557.
- .3 Acoustical Performance:
 - .1 Test partitions in an independent acoustical laboratory in accordance with ASTM E90 to attain no less than an STC rating specified. Provide a complete and unedited written test report by the testing laboratory upon request.

1.5 SUBMITTALS

- .1 Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable partition, component, and accessory specified.
- .2 Shop Drawings:
 - .1 Show location and extent of operable partitions.
 - .2 Include plans, elevations, sections, details, attachments to other construction, and accessories.
 - .3 Indicate dimensions, weights, conditions at openings and at storage areas, and required installation, storage, and operating clearances.
 - .4 Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel.
 - .5 Indicate blocking to be provided by others.

- .3 Setting Drawings: Show imbedded items and cutouts required in other work, including support beam punching template.
- .4 Samples:
 - .1 Colour samples demonstrating full range of finishes for the Consultant's selection.
 - .2 Provide duplicate samples of actual material in selected colour, in same thickness and material as proposed for the work.
- .5 Maintenance data: Provide maintenance data for incorporation into the operation and maintenance manual specified in Section 01 78 00 "Closeout Submittals".

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Clearly mark packages and partitions with numbering systems used on Shop Drawings. Do not use permanent markings on partitions.
- .2 Protect partitions during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent damage.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials, including packaging materials, in accordance with Section 01 74 21 "Waste Management and Disposal".

1.8 WARRANTY

- .1 Provide written warranty by manufacturer of operable partitions agreeing to repair or replace any components with manufacturing defects.
- .2 Partition Warranty period: Two (2) years from date of substantial performance.
- .3 Suspension System Warranty: Five (5) years from date of substantial performance.

Part 2 PRODUCTS

2.1 MANUFACTURERS, PRODUCTS, AND OPERATIONS

- .1 Products: Provide the following product:
 - .1 OP-01: Acousti-Seal Encore – Paired Panel: Manually operated paired panel operable partition by Modernfold Inc.
 - .2 Manufacturers: Subject to compliance with requirements, provide products by the following approved alternates on the provision it meets all requirements and/or specifications as per 2.1.1.1:
 - .1 Corflex/Hufcor Inc.
 - .2 Moderco Inc.
 - .3 Panelfold Inc.

2.2 OPERATION

- .1 OP-01: Acousti-Seal Encore - Paired Panel: Series of paired flat panels hinged together in pairs, manually operated, top supported with operable floor seals and automatic top seals.

- .2 Final Closure:
 - 1. OP-01: Horizontally expanding panel edge with removable crank.

2.3 PANEL CONSTRUCTION

- .1 Nominal 4.25-inch (108 mm) thick panels in manufacturer's standard 51-inch (1295 mm) widths. All panel horizontal and vertical framing members fabricated from minimum 16-gauge formed steel with overlapped and welded corners for rigidity. Top channel is reinforced to support suspension system components. Frame is designed so that full vertical edges of panels are of formed steel and provide concealed protection of the edges of the panel skin.
- .2 Panel skin to be:
 - 1. OP-01: Roll-formed steel wrapping around panel edge. Panel skins to be lock formed and welded directly to the frame for unitized construction. Acoustical ratings of panels with this construction minimum:
 - a. 54 STC.
- .3 Hinges for Panels, Closure Panels, Pass Doors, and Pocket Doors to be:
 - 1. OP-01: Full leaf butt hinges, attached directly to the panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame. Lifetime warranty on hinges. Hinges mounted into panel edge or vertical astragal are not acceptable.
- .4 Panel Trim: No vertical trim required or allowed on edges of panels; minimal groove appearance at all panel joints.
- .5 Panel Weights:
 - .1 OP-01: 54 STC – 9.5 lbs/sq.foot.

2.4 PANEL FINISH

- .1 Panel finish to be factory applied, Class "A" rated material. Finish to be:
 - 1. OP-01: Reinforced vinyl with woven backing weighing not less than 21 ounces (595 grams) per lineal yard.
- .2 Panel Trim: Exposed panel trim of one consistent colour:
 - 1. OP-01: TBD.

2.5 SOUND SEALS

- .1 Vertical Interlocking Sound Seals between panels: Aluminum astragals, with tongue and groove configuration in each panel edge. Rigid plastic astragals are not acceptable.
- .2 Horizontal Top Seals to be Modernfold SureSet™ automatic operable top seals, manually operated top seals not required or permitted.
- .3 Horizontal bottom floor seals to be Modernfold Sureset™ bottom seal:
 - 1. OP-01: Modernfold SM2 Bottom Seal. Manually activated seals providing nominal 2" (51 mm) operating clearance with an operating range of + 0.50" (13 mm) to -1.50" (38 mm). Seal to be operable from panel edge or face. Extended seal to exert nominal 120 pounds (265 kg) downward force to the floor throughout operating range.

2.6 SUSPENSION SYSTEM

- .1 OP-01: #17 Suspension System
 - 1. Suspension Tracks: Minimum 11-gauge, 0.12-inch (3.04 mm) roll-formed steel track, suitable for either direct mounting to a wood header or supported by adjustable steel hanger brackets, supporting the load-bearing surface of the track, connected to structural support by pairs of 0.38-inch (10 mm) diameter threaded rods. Aluminum track is not acceptable.
 - a. Exposed track soffit: Steel, integral to track, and pre-painted off-white.
 - 2. Carriers: One all-steel trolley with steel tired ball bearing wheels per panel (except hinged panels). Non-steel tires are not acceptable.

2.7 PROVIDE THE FOLLOWING:

- .1 Accessories:
 - 1. OP-01: Pocket Doors: Acousti-Seal Pocket Doors by Modernfold, Inc., with same construction, finish, and appearance as the adjacent panels.
 - .1 Pocket Door configuration to be manually operated: Type III double doors hinged to a jamb on each side and closing in the center. One of the door panels is equipped with a smaller hinged panel that folds back when the operable partition is extended into the pocket.

Part 3 EXECUTION

3.1 INSTALLATION

- .1 General: Comply with ASTM E557, operable partition manufacturer's written installation instructions, Drawings and approved Shop Drawings.
- .2 Install operable partitions and accessories after other finishing operations, including painting have been completed.
- .3 Match operable partitions by installing panels from marked packages in numbered sequence indicated on Shop Drawings.
- .4 Broken, cracked, chipped, deformed or unmatched panels are not acceptable.

3.2 CLEANING AND PROTECTION

- .1 Clean partition surfaces upon completing installation of operable partitions to remove dust, dirt, adhesives, and other foreign materials according to manufacturer's written instructions.
- .2 Provide final protection and maintain conditions in a manner acceptable to the manufacturer and installer that insure operable partitions are without damage or deterioration at time of Substantial Completion.

3.3 ADJUSTING

- .1 Adjust operable partitions to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

3.4 EXAMINATION

- .1 Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable partitions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 DEMONSTRATION

- .1 Demonstrate proper operation and maintenance procedures to Owner's representative.
- .2 Provide Operation and Maintenance Manual to Owner's representative.

END OF SECTION

PART 1- GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM A 167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B 456-03, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A 653/A 653M-09, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A 924/A 924M-09, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CGSB 31-GP-107MA-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 CSA International
 - .1 CAN/CSA-B651-04, Accessible Design for the Built Environment.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings: Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars

1.3 MAINTENANCE MATERIAL SUBMITTALS

- .1 Tools: Provide special tools required for assembly, disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals. Deliver special tools to Owner.

PART 2- PRODUCTS

2.1 MATERIALS

- .1 Sheet steel: to ASTM A 653/A 653M with ZF001 designation zinc coating.
- .2 Stainless steel sheet metal: to ASTM A 167, Type 304, with No.4 satin luster finish.
- .3 Stainless steel tubing: A1S1 Type 304, commercial grade, seamless welded, 1.2 mm wall thickness.
- .4 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use. Exposed fasteners shall be same finish as surrounding material.

2.2 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.
- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CAN/CSA-G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide "in wall" carriers, steel anchor plates and components for installation on studding and building framing

2.3 FINISHES

- .1 Chrome and nickel plating: to ASTM B 456, satin finish.
- .2 Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31-GP-107Ma, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Consultant.
- .3 Manufacturer's or brand names on face of units not acceptable.

2.4 WASHROOM ACCESSORIES

- .1 Supply and install the following:
 - .1 Coat Hook
 - .1 Henkel HDB003R, colour selected by owner
 - .2 Quantity required:
 - .1 2 mounted on walls
 - .2 12 mounted on toilet partitions
 - .2 760 x 760 mm 90 degree L-shaped Grab Bar: 36 mm o.d., stainless steel, Concealed fasteners, peened grip surface. By Frost, Code 1001 Series. (Or equivalent) in Washrooms:
 - .1 Quantity Required: 6
 - .3 600mm horizontal Grab Bar: 36 mm o.d., stainless steel, 600mm long, Concealed fasteners, peened grip surface. By Frost, Code 1001 Series. (Or equivalent) in Washrooms:
 - .1 Quantity Required: 6
 - .4 750mm horizontal Fold-down Grab Bar: 36 mm o.d., stainless steel, 600mm long, Concealed fasteners, peened grip surface. By Frost, Code 1001 Series. (Or equivalent) in Washrooms:
 - .1 Quantity Required: 1
 - .5 Shelf Manufactured by Frost, Model No. 950-4x18 – Heavy duty shelf, max 100 mm depth, one in each barrier free washroom.
 - .1 Quantity Required: 1
 - .6 Mirror: 915mm x 610mm
 - .1 Acceptable Material: Bobrick B165 2436, or approved equivalent.
 - .2 Quantity: 14

- .7 Tilt Mirror: 910 x 610mm
 - .1 Acceptable Material: Bobrick B293 2436, or approved equivalent
 - .2 Vandalproof fastenings
 - .3 10 year guarantee for mirror
 - .4 Quantity: 2
- .8 Hand Dryer – refer to electrical drawings
- .9 Paper Towel Dispenser
 - .1 Acceptable Material: Tork Mechanical Hand Towel Roll Dispenser
 - .2 Colour: black
 - .3 Quantity: 12
- .10 Soap Dispenser
 - .1 Acceptable Material: GOJO ADX-12 Dispenser 1250-ML
 - .2 Colour: Gray/white
 - .3 Quantity: 16
- .11 Sanitary Napkin Disposal
 - .1 Acceptable Material: Bobrick B-270
 - .2 Surface Mount
 - .3 Quantity: 11
- .12 Toilet Paper Holder
 - .1 Acceptable Material:
 - .1 Washroom Stalls: Tork Single Jumbo Bath Tissue Roll Dispenser
Quantity: 12
 - .2 Other washrooms: Tork Twin Jumbo Bath Tissue Roll Dispenser
Quantity: 8
 - .2 Colour: Smoke Grey

PART 3- EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrates and surfaces to receive toilet and bathroom accessories previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to toilet and bathroom accessories installation.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Install and secure accessories rigidly in place as follows:
 - .1 Stud walls: Install wood blocking into cavity. Install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
 - .2 Hollow masonry units, existing plaster or drywall: use toggle bolts drilled into cell or wall cavity.
 - .3 Solid masonry, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.
 - .4 Toilet and shower compartments: use male to female through bolts.
- .2 Install grab bars on built-in anchors provided by bar manufacturer. Supply templates, details and instructions for building in anchors in toilet compartments.
- .3 Use tamper proof screws/bolts for fasteners.

- .4 Fill units with necessary supplies shortly before final acceptance of building.
- .5 Install mirrors in accordance with manufacturer's instructions.

3.3 ADJUSTING

- .1 Adjust toilet and bathroom accessories components and systems for correct function and operation in accordance with manufacturer's written instructions.
- .2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by toilet and bathroom accessories installation.

END OF SECTION

PART 1- GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 08 44 13 – Aluminum Curtain Walls, Windows and Doors.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM D 1784-11, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Indicate on drawings dimensions in relation to window jambs, operator details, head and sill anchorage details, hardware and accessories details.
- .3 Samples:
 - .1 Submit one representative working sample of each type roller shade.
 - .2 Submit duplicate samples of manufacturer's standard colours for selection by Consultant.
 - .3 After approval samples will be returned for incorporation into Work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirement and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect horizontal louvre blinds from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer pallets, crates, padding and packaging materials.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

- .1 Design roller shades to following requirements:

- .1 Be designed in a manner that allows wear susceptible parts to be replaceable by either user or manufacturer.
- .2 Be accompanied by instructions for replacing or repairing worn parts, including inventory numbers for parts and procedures for ordering replacement parts.
- .3 Be designed in a manner that permits effective disassembly of components in order to permit recycling of materials for which recycling markets exist.
- .4 Include stamps on major plastic components indicating composition code to facilitate recycling efforts.

2.2 MATERIALS AND FABRICATION

- .1 Roller shade: Chain Roller Shade with Optispace ALS complete with cassette headrail (aluminum finish) by Altex or equivalent product by Shade O Matic.
 - .1 Stainless steel or plastic chain with heavy duty clutch and spring assisted system where recommended by manufacturer.
 - .2 Fabric: Woven PVC/Polyester, Sheerweave with 1% openness factor. Meets NFPA 701 for flame retardance. Colour to be Alabaster.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install roller shades at all new windows as indicated on drawings.
- .2 Site measure all openings and ensure fit with minimum gaps around shade.
- .3 Include centre brackets where necessary to prevent deflection of headrail.
- .4 Adjust to provide for operation without binding.
- .5 Use non corrosive metal fasteners for installation, concealed in final assembly.
- .6 Do not install window coverings to window frames.

3.2 ADJUSTING

- .1 Adjust roller shades components for correct function and operation in accordance with manufacturer's written instructions.
- .2 Lubricate moving parts to operate smoothly and fit accurately.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by roller shades installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 23 33 – Excavating, Trenching and Backfilling.
- .3 Section 32 11 16 – Granular Sub-Base
- .4 Section 32 11 23 – Aggregate Base Courses.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International).
 - .1 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- .2 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS MUNI 1002 – Material Specification for Aggregates – Concrete
 - .2 OPSS MUNI 1004 – Material Specification for Aggregates – Miscellaneous
 - .3 OPSS MUNI 1010 – Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material

1.3 SOURCE QUALITY CONTROL

- .1 Source of materials to be incorporated into work or stockpiles requires approval.
- .2 Inform Contract Administrator of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .3 If, in opinion of Contract Administrator, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .4 Should a change of material source be proposed, advise Contract Administrator 4 weeks in advance of proposed change to allow sampling and testing.
- .5 Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if its field performance is found to be satisfactory.

1.4 SAMPLES

- .1 Aggregate will be subject to continual sampling by Contract Administrator during production.
 - .2 Provide Contract Administrator with access to source and processed material for sampling and testing.
 - .3 Bear the cost of sampling and testing of aggregates which fail to meet specified requirements.
-

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed five times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock or slag.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
- .5 Granular 'A' to OPSS MUNI 1010.
- .6 Granular 'B' top OPSS MUNI 1010.
- .7 19mm Clear Stone to OPSS MUNI 1004.
- .8 Clean, crushed, angular stone, nominal size distribution between 19mm to 51mm, as per AASHTO M43 3, 4.

PART 3 **EXECUTION**

3.1 **DEVELOPMENT OF AGGREGATE SOURCE**

- .1 Contractor to produce aggregates off site.
- .2 Contractor to develop aggregate source to prevent contamination of aggregates stockpiled.

3.2 **PROCESSING**

- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Contract Administrator.
 - .3 Wash aggregates, if required to meet specifications. Use only equipment approved by Contract Administrator.
-

- .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

3.3 HANDLING

- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.4 STOCKPILING

- .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Contract Administrator. Do not stockpile on completed pavement surfaces.
- .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.
- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Contract Administrator within two (2) working days of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.0 m for coarse aggregate and base course materials.
 - .2 Max 2.0 m for fine aggregate and sub-base materials.
 - .3 Max 1.5 m for other materials.
- .8 Complete each layer over entire stockpile area before beginning next layer.
- .9 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .10 Do not cone piles or spill material over edges of piles.
- .11 Do not use conveying stackers.
- .12 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.5 CLEANING

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat compact stockpiles as directed by Contract Administrator.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 31 05 16 – Aggregate Materials.
- .3 Section 33 41 00 – Storm Sewers

1.2 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB).
 - .1 CA/CGSB-8.2, Sieves, Testing, Woven Wire, Metric
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001, Cementitious Materials for Use in Concrete.
 - .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .4 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD)
- .5 Geotechnical Investigation, prepared by EXP Services Inc., and dated December 9, 2025.

1.3 **DEFINITIONS**

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 2 m³. Frozen material not classified as rock. There shall be no compensation for boulder removal for boulders which can be removed by mechanical means with a 1.95 m³ bucket.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

- .2 Unclassified excavation: excavation of deposits of whatever character encountered in work.
- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .4 Waste material: excavated material unsuitable for use in work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.
- .6 Unsuitable materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1.

<u>Sieve Designation</u>	<u>%Passing</u>
2.00 mm	100
0.10 mm	45-100
0.02 mm	10-80
0.005 mm	0-45
 - .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .7 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum Portland cement content of 25 kg/m³.
 - .3 Minimum strength of 0.07 MPa at 24 h.
 - .4 Concrete aggregates: to CSA-A23.1/A23.2,
 - .5 Cement: to CSA A3000, Type GU.
 - .6 Slump: 160 to 200 mm.

1.4 SUBMITTALS

- .1 Inform Contract Administrator at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.
- .2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
- .3 Ship samples as directed by Contract Administrator in tightly closed containers to prevent contamination.

1.5 QUALITY ASSURANCE

- .1 Submit design and supporting data at least 2 weeks prior to commencing work.
- .2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in the Province of Ontario.

- .3 Keep design and supporting data on site.
- .4 Do not use soil material until written report of soil test results are reviewed and approved by Contract Administrator.

1.6 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to commencing excavation work, notify applicable Owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
 - .6 Confirm locations of buried utilities by careful test excavations.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
 - .8 Where utility lines or structures exist in area of excavation, obtain direction of Contract Administrator before removing or re-routing.
 - .9 Record location of maintained, re-routed and abandoned underground lines.
 - .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Contract Administrator condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by work.
 - .2 Protect existing buildings and surface features from damage while work is in progress. In event of damage, immediately make repair to approval of Contract Administrator.
 - .3 Where required for excavation, cut roots or branches as approved by Contract Administrator.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Type 1 fill: Granular 'A' as per OPSS 1010 and Section 31 05 16 - Aggregate Materials.
 - .2 Type 2 fill: Granular 'B' Type II as per OPSS.MUNI 1010 and Section 31 05 16 – Aggregate Materials.
 - .3 Type 3 fill: select subgrade material as per OPSS.MUNI 1010 from excavation or other sources, approved by Contract Administrator for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
 - .4 Geotextile: Type II Non-woven as per OPSS 1860.
-

- .5 Clear stone per OPSS.MUNI 1004.
- .6 Sand: Mortar sand or uniformly graded sand as per OPSS 1004.

PART 3 **EXECUTION**

3.1 **SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 **PREPARATION/PROTECTION**

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Contract Administrator's approval.
- .3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage. Protect buried services that are required to remain undisturbed.
- .4 Protect buried services that are required to remain undisturbed.

3.3 **EROSION AND SEDIMENT CONTROL**

- .1 As per the requirements of Specification 31 32 25.

3.4 **STRIPPING OF TOPSOIL**

- .1 Commence topsoil stripping of areas as indicated by Contract Administrator after area has been cleared of brush, weeds and grasses and removed from site.
- .2 Strip topsoil to depths as indicated by Contract Administrator. Do not mix topsoil with subsoil.
- .3 Stockpile in locations as directed by Contract Administrator. Stockpile height not to exceed 2 m.
- .4 Dispose of unused topsoil off-site or as directed by Contract Administrator.

3.5 **STOCKPILING**

- .1 Stockpile fill materials in areas designated by Contract Administrator. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.6 **COFFERDAMS, SHORING, BRACING AND UNDERPINNING**

- .1 Maintain side and slopes of excavations in safe condition by appropriate methods and in accordance with Occupational Health and Safety Act for the Province of Ontario.
- .2 Design and construct temporary works to depths, heights and locations as required for new work.

- .3 During backfill operation:
 - .1 Unless otherwise as indicated or as directed by Contract Administrator remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.
- .4 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .5 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site as indicated and as directed from Contract Administrator.

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while work is in progress.
- .2 Submit for Contract Administrator's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or any portion of work completed or under construction.
- .6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas. Maximum allowable concentration of suspended solids in discharge shall be 25 mg/L TSS.

3.8 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated by Contract Administrator.
 - .2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation. Dispose of material off site.
 - .3 Excavation must not interfere with bearing capacity of adjacent foundations.
 - .4 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
 - .5 For trench excavation, unless otherwise authorized by Contract Administrator in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
-

- .6 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Contract Administrator.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material off site.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Contract Administrator when bottom of excavation is reached.
- .12 Obtain Contract Administrator approval of completed excavation.
- .13 Remove unsuitable material from trench bottom to extent and depth as directed by Contract Administrator.
- .14 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with concrete specified for footings.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected maximum dry density.
- .15 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Contract Administrator.
- .16 Division 31 will complete all required trenching and backfilling required for work of Division 20, 26 and 44.

3.9 FILL TYPES AND COMPACTION

- .1 Use fill of types as indicated or specified below. Compaction densities are percentages of Standard Proctor Maximum Dry Densities (SPMDD) obtained from ASTM D698.
 - .1 Slabs-on-grade:
 - .1 Type 2 fill, thickness as required to raise the floor subgrade, compacted to minimum 98% SPMDD, in maximum 300 mm thick lifts.
 - .2 19mm clear stone or Type 1 fill to underside of slab, minimum compacted thickness of 150 mm, compacted to minimum 98% SPMDD, in maximum 300 mm thick lifts.
 - .2 Footings founded on structural fill:
 - .1 Type 2 fill placed over undisturbed native soil, thickness as required to achieve design footing subgrade elevation (minimum compacted thickness of 200 mm), compacted to minimum 100% SPMDD, in maximum 300 mm thick lifts.
 - .2 Type 1 fill to underside of footing, minimum compacted thickness of 150 mm, compacted to minimum of 100% SPMDD, in maximum 300 mm thick lifts.
 - .3 Exterior side of perimeter walls:

- .1 Type 2 fill for 1.0m beyond face of foundation wall, thickness as required to reach subgrade level, compacted to 95% SPMDD.
- .2 Type 3 fill for other areas, thickness as required to reach subgrade level, compacted to 95% SPMDD.
- .4 Subgrade:
 - .1 Compact existing subgrade under walkways, paving, and sidewalks to same compaction as fill above.
- .5 Under grassed areas:
 - .1 Type 3 fill, thickness as required to reach underside of topsoil, compacted to 95% SPMDD.
- .6 To correct over excavation in trenches:
 - .1 Type 2 fill to underside of Granular "A" bedding, compacted to 95% SPMDD.

3.10 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.11 BACKFILLING

- .1 Vibratory compaction equipment: approved by Contract Administrator.
- .2 Do not proceed with backfilling operations until Contract Administrator has inspected and approved installations.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfill around installations.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 600 mm.
 - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures.
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure, and approval obtained from Contract Administrator, or
 - .2 If approved by Contract Administrator, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Contract Administrator.

- .7 Division 31 will perform required excavation, trenching and backfilling required for all Divisions. General Contractor to coordinate details of all Divisions to determine the extent of work to be provided.

3.12 RESTORATION

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Contract Administrator.
- .2 Replace topsoil as indicated by Contract Administrator.
- .3 Reinstall lawns to elevation which existed before excavation.
- .4 Reinstall pavement and sidewalks disturbed by excavation to thickness, structure, and elevation which existed before excavation.
- .5 Clean and reinstall areas affected by work as directed by Contract Administrator.
- .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 h.
- .7 Protect newly graded areas from traffic and erosion and maintain free of trash and debris.
- .8 Dispose of surplus material and material unsuitable for fill grading or landscaping off site.

3.13 FIELD QUALITY CONTROL

- .1 Testing of materials and compaction of backfill and fill will be carried out by testing laboratory designated by Owner.
- .2 Do not begin backfilling or filling operations until material has been approved for use by Contract Administrator.
- .3 Not later than 48 hours before backfilling or filling with approved material, notify Contract Administrator to allow compaction tests to be carried out by testing agency designated by Owner.

END OF SECTION

PART 1 GENERAL

1.1 OBJECTIVES

- .1 Prevent the loss of soil from construction site resulting from storm water runoff, wind erosion and construction activities.
- .2 Prevent the sedimentation of storm sewers and receiving waters.
- .3 Prevent air pollution caused by dust and particulate matter.

1.2 DESCRIPTION OF WORK

- .1 Implement the Erosion and Sedimentation Control (ESC) measures shown on the project drawings and described in these specifications.
- .2 Install ESC products in accordance with contract drawings.
- .3 Inspect ESC measures on a weekly basis and following all significant storm events. If deficiencies are found, make repairs within 24 hours of detection.
- .4 Maintain an ESC inspection log to document observations, deficiencies and corrective actions.

1.3 REFERENCES

- .1 U.S. Environmental Protection Agency, Office of Water. "Chapter 3: Sediment and Erosion Control" and Chapter 4: Other Controls". Document No. EPA 832-R-92-005 Storm Water Management for Construction Activities.

1.4 SUBMITTALS

- .1 Inspection Checklist – Schedule A
 - .1 Prepare the checklist to include all measures shown on the drawings and described in the specifications.
 - .2 Complete a new checklist with each inspection and keep completed checklists with the weekly inspection log documentation.
- .2 Weekly Inspection Log – Schedule B
 - .1 Complete the log on a weekly basis and keep all documentation on-site and available for review by the Contract Administrator.
 - .2 The inspection log shall be completed for each inspection, and must document deficiencies for all measures indicated as "Not OK" on the inspection checklist.
 - .3 Each deficiency must be initialled and each log signed, only after all corrective measures have been completed and documented.
 - .4 Submit all ESC documentation (e.g.: inspection checklists and inspection log) to the Contract Administrator after final landscaping is completely installed.
- .3 Photographs:
 - .1 A minimum of three (3) digital photographs shall be taken (from various viewpoints) of each ESC measure implemented on-site immediately following installation.

- .2 A minimum of three (3) digital photographs shall be taken (from various viewpoints) of ESC measure implemented on-site at the end of construction or prior to dismantling, whichever comes first.
- .3 Submit all digital photographs to Contract Administrator for documentation within seven (7) days of being taken.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Geotextile: Type II Non-woven as per OPSS 1860
- .2 Straw Bales and Silt Fencing as per OPSD 219.180 and 219.130.

PART 3 EXECUTION

3.1 INSPECTIONS AND MAINTENANCE

- .1 Inspection procedures specified below summarize the EPA document and shall be followed in conjunction with details, drawings and manufacturer requirements.
 - .2 Inspect all control measures at least once each week (unless otherwise noted) and following any significant storm (13 mm of precipitation or greater). Complete the inspection log for each inspection, and keep in an accessible location on site until all corrective measures have been documented. Submit each completed log to the Contract Administrator for review.
 - .3 Maintain all measures in good working order. If a repair is necessary, initiate within 24 hours of report.
 - .4 Stabilized Construction Entrance: Apply additional gravel as required, remove sediments and other materials from all areas to minimize clogging. Keep adjacent public roadway(s) free from sediment.
 - .5 Site Arrangement: Verify that movement of construction equipment to appropriate area occurs at the same time as movement of construction activities.
 - .6 Material Stockpile: Inspect for effective prevention of runoff and erosion. Remove built-up sediment from silt fence when it has reached 1/3 the height of the filter fabric.
 - .7 Preservation of Natural Vegetation: Routine maintenance shall include mowing, fertilizing, liming, irrigating, pruning and weed and pest control, depending on the specific species and environmental conditions. Remove any debris and ensure area is protected from traffic.
 - .8 Buffer Zones: Routine maintenance shall include mowing, fertilizing, liming, irrigating, pruning and weed and pest control, depending on the specific species and environmental conditions. Remove any debris and ensure area is protected from traffic.
 - .9 Soil Retaining Measures: Inspect for structural damage and repair as required.
 - .10 Permanent Seeding: Inspect for sufficient growth and water conditions. Replant areas if cover does not provide erosion control.
-

- .11 Silt Fence: Silt fence to be inspected for depth of sediment, tears, loose fabric attachment at fence posts, channel erosion beneath fence, sagging or collapse, and to ensure the fence posts are firmly in the ground. Built-up sediment is to be removed from silt fence when it has reached 1/3 the height of the fence. Repair such that fence is in original installation condition.
- .12 Outlet Protection: Inspect for erosion and pooling of water. Necessary repairs to be made as required to reduce exit velocity of runoff. If a riprap apron is used, inspect for riprap displacement and damage to filter fabric.
- .13 Check Dams: Inspect for sediment and debris accumulation and erosion of sides. Sediment should be removed when it reaches ½ the original dam height. Repair dam as required.
- .14 Drainage Swale: Inspect for dips or low points along the swale where water is pooling and ensure that runoff is being directed to sediment-trapping measure used onsite.
- .15 Subsurface Drains: Inspect pipe for breaks or clogging by sediment or debris. Remove blockage immediately, replace any broken sections and restabilize the surface. Check inlets and outlets for sediment or debris, and remove and dispose of these materials properly.

3.2 REMOVAL OF PRODUCTS

- .1 ESC measures shall not be removed and shall be fully inspected and maintained until final landscaping is complete.

Project Name: _____

Completed By: _____

Date: _____

For all measures marked as “Not OK”, the Inspection Log must be completed. List the measures that are deficient in the “Deficiencies” column on the Inspection Log, and record the maintenance performed. Submit both the Inspection Checklist and Inspection Log to the Contract Administrator after all maintenance activities have been completed and recorded.

[illegible]

Inspection Log – Schedule B

Erosion & Sedimentation Control Weekly Inspection Log

Log Start Date: _____

Log End Date: _____

Log Completed By: _____

Company: _____

Telephone No.: _____

Inspection Date	General Observations (ie: seasonal conditions)	Location & Deficiency of ESC Measure	Corrective Measures	Initials

I hereby certify that the information provided is complete, correct and complies with the requirements of EPA Best Management Practices.

Signature	Title	Date

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 23 33 - Excavating, Trenching and Backfilling.
- .3 Section 32 11 23 - Aggregate Base Courses.

1.2 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .4 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .5 ASTM D4318, Standard Test Methods for Liquid Unit, Plastic Unit and Plasticity Index of Soils.
 - .6 Ontario Provincial Standard Specification (OPSS) Division 10.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS MUNI 1010 – Material Specifications for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Granular sub-base material to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Granular 'B', Type II as per OPSS.MUNI 1010, maximum aggregate size 65 mm.

PART 3 **EXECUTION**

3.1 **EXAMINATION**

- .1 Verify conditions of subgrade are acceptable for granular sub-base installation.
 - .2 Inform Contract Administrator 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 Contract Administrator.

3.2 PLACING

- .1 Place granular sub-base after subgrade is inspected and approved by Contract Administrator.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.
- .5 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Contract Administrator may authorize thicker lifts (layers) if specified compaction can be achieved.
- .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .8 Remove and replace portion of layer in which material has become segregated during spreading.
- .9 Place material to minimum compacted thickness as shown on drawings, or thicker as required to achieve design base elevation.
- .10 Transition between new and existing pavement structures with a 5 horizontal to 1 vertical taper to match the depths of the granular material exposed in the existing pavement.

3.3 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
 - .2 Compact to density of not less than 100% of Standard Proctor Maximum Dry Density (SPMDD) to ASTM D698.
 - .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
 - .4 Apply water as necessary during compaction to obtain specified density.
 - .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.
 - .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
-

3.4 PROOF ROLLING

- .1 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .2 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove sub-base and subgrade material to depth and extent as directed by the Contract Administrator.
 - .2 Backfill excavated subgrade with Type 3 fill as per Section 31 23 33 – Excavating, Trenching and Backfilling and compact in accordance with this section.
 - .3 Replace sub-base material and compact in accordance with this section.

3.5 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.
- .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.6 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Contract Administrator.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 32 11 16 – Granular Sub-Base

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM D136, Standard Test Method for Sieve Analysis of Fine and Course Aggregated.
 - .4 ASTM D698, Stand Test Methods for Laboratory Compaction Characteristics of Soil Using standard Effort (12,400 ft-lbf/ft³)(600 N m/m³).
 - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318, Standard Test Methods for Liquid Unit, Plastic Unit and Plasticity Index of Soils.
 - .7 Ontario Provincial Standard Specifications (OPSS) Division 10.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-, Sieves, Testing, Woven Wire, Metric.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS MUNI 1010 – Material Specifications for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and stockpile aggregates in accordance with Section 31 05 16 – Aggregate Materials.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Granular base: material to Section 31 05 16- Aggregate Materials and the following requirements:
 - .1 Granular 'A' to OPSS.MUNI 1010

2.2 SEQUENCE OF OPERATION

- .1 Place granular base after granular sub base surface is inspected and approved by Contract Administrator.
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.

- .3 Place material only on clean unfrozen surface, free from snow and ice.
- .4 Place material using methods which do not lead to segregation or degradation of aggregate.
- .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
- .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .2 **Compaction Equipment**
 - .1 Compaction equipment to be capable of obtaining required material densities.
- .3 **Compacting**
 - .1 Compact to no less than 100% of standard proctor maximum dry density (SPMDD).
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

2.3 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

2.4 PROTECTION

- .1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Contract Administrator.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Materials and installation for asphalt pavement for areas identified.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 31 05 16 – Aggregate Materials.
- .3 Section 31 23 33 – Excavating, Trenching and Backfilling.
- .4 Section 32 11 23 – Aggregate Base Course.
- .5 Section 32 16 00 – Concrete Walks, Curbs and Gutters.
- .6 Section 32 17 23 – Pavement Marking.

1.3 **REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2, Sieves Testing, Woven Wire, Metric.
 - .2 CAN/CGSB-16.1, Cutback Asphalts for Road Purposes.
- .2 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO M320 - Standard Specification for Performance Grade Asphalt Binder.
- .3 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
 - .2 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C123, Standard Test Method for Lightweight Particles in Aggregate.
 - .4 ASTM C127, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
 - .5 ASTM C128, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
 - .6 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .7 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .8 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .9 ASTM D977 – Standard Specification for Emulsified Asphalt.
 - .10 ASTM D995, Standard Specification for Requirements Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

- .11 ASTM D2419, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- .12 ASTM D3203, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
- .4 Asphalt Institute (AI)
 - .1 Asphalt Institute MS-2-1993 Sixth Edition, Mix Design Methods for Asphalt Concrete.
- .5 Ontario Provincial Standard Specifications (OPSS).

1.4 SUBMITTALS

- .1 Submit asphalt concrete mix design to Contract Administrator for approval.
- .2 Materials to be tested by testing laboratory approved by Contract Administrator.
- .3 Submit test certificates showing suitability of materials at least 4 weeks prior to commencing work.
- .4 Inform Contract Administrator of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing work.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Granular base and sub-base material to Section 31 05 16 – Aggregate Materials, Section 32 11 16 Granular Sub-Base and Section 31 11 23 Aggregate Base Courses.
- .2 HL-3 and HL-8 hot mix asphalt, compacted thickness as indicated on drawings, PGAC 58-34, per OPSS 1001, 1003, 1101 and 1150.
- .3 Asphalt cement: to AASHTO M320.
- .4 Aggregates per Section 31 05 16 – Aggregate Materials; gradation per OPSS 1003.
- .5 Asphalt tack coat: to SS-1 or RS-1 as per OPSS 1103, depending on weather at the time of asphalt paving operations.

2.2 MIX DESIGN

- .1 Job mix formula to be approved by Contract Administrator.
- .2 Do not change job-mix without prior approval of Contract Administrator. When change in material source proposed, new job-mix formula to be approved by Contract Administrator.
- .3 Return plant dust collected during processing to mix in quantities acceptable to Contract Administrator.

2.3 EQUIPMENT

- .1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

- .2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix. Roller combination shall be as per OPSS 310 for a production rate of 120 t/hr.
- .3 Vibratory rollers for parking lots and driveway:
 - .1 Minimum drum diameter: 750mm.
 - .2 Maximum amplitude of vibration (machine setting): 0.5mm for lifts less than 40mm thick.
- .4 Haul trucks: of sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
- .5 Suitable hand tools

PART 3 **EXECUTION**

3.1 **PREPARATION**

- .1 Fine grade aggregate base course, add/remove aggregate as required.
- .2 Re-compact aggregate base course to achieve 100% Standard Proctor Maximum Dry Density (SPMDD) as required.
- .3 Install tack coat on all milled surfaces and on all vertical surfaces abutting new asphalt.

3.2 **ASPHALT PAVING**

- .1 Obtain approval of primer from Contract Administrator before placing asphalt mix.
 - .2 Place asphalt mix only when base or previous course is dry and air temperature is above 7°C and rising.
 - .3 When temperature of surface on which the material is to be placed falls below 10° C, provide extra rollers as necessary to obtain required compaction before cooling.
 - .4 Place asphalt concrete in compacted layers as indicated on construction drawings but not exceeding 50 mm.
 - .5 Minimum 120°C mix temperature required when spreading.
 - .6 Maximum 160°C mix temperature permitted at any time.
 - .7 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
 - .8 Compact asphalt concrete to density not less than 92 % of Maximum Relative Density (MRD) obtained with Marshall specimens prepared in accordance with ASTM D1559, from samples of mix being used. Roll until roller marks are eliminated.
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- .9 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .10 Carefully use vibratory equipment near existing building foundations.
- .11 Moisten roller wheels with water to prevent pick up of material.
- .12 Compact mix with hot tampers or other equipment approved by Contract Administrator in areas inaccessible to roller.
- .13 Finish surface to be within 5 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.
- .14 Repair areas showing checking, rippling or segregation as directed by Contract Administrator.

3.3 JOINTS

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip. Complete joints to existing asphalt as indicated on contract drawings.
- .2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with tack coat prior to placing adjacent pavement.
- .3 For cold joints, cut back to full depth vertical face and tack face with tack coat.
- .4 For longitudinal joints, overlap previously laid strip with spreader by 150 mm.
- .5 Carefully place and compact hot asphaltic material against joints.
- .6 Mill existing asphalt and step connect to existing asphalt as per Contract Drawings where existing asphalt thickness is equal to or greater than 80 mm. Tack coat vertical and horizontal surfaces.

3.4 PROTECTION

- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38°C. Do not permit stationary loads on pavement until 24 hours after placement.
- .2 Provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 03 30 00 – Cast-In-Place Concrete
- .2 Section 31 23 33 - Excavating, Trenching and Backfilling.
- .3 Section 32 11 23 – Aggregate Base Courses.

1.2 **REFERENCES**

- .1 Canadian Standards Association (CSA).
 - .1 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 American Society for Testing and Materials (ASTM).
 - .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .2 ASTM D2628, Standard Specification for Performed Polychloroprene Elastomeric Joint Seals for concrete Pavements.
- .3 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD)

1.3 **TESTING**

- .1 Testing of concrete to CAN3-A23.1.

1.4 **ENVIRONMENTAL CONDITIONS**

- .1 If temperature is below 5°C or if Contract Administrator anticipates a temperature drop below this value within the next 24 hours, take all necessary measures to protect concrete from freezing.
- .2 Do not place concrete on frozen base.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Concrete mixes and materials: according to Section 03 30 00 – Cast-in-Place Concrete.
 - .2 Granular base: Granular “A” to OPSS.MUNI 1010, to Section 32 11 23 – Aggregate Base Courses and to Section 31 23 33 - Excavating, Trenching and Backfilling.
 - .3 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.
 - .4 Curing blankets shall be Terraxfix 240R non-woven geotextile (white). No alternate. Curing compounds are not permitted.
 - .5 Expansion joints to be 12mm thick bituminous fibre per OPSS 1308.
-

- .6 Formwork shall be as per OPSS 919.
- .7 Tactile walking surface indicator plates (TWSI) shall be made from gray cast iron conforming to ASTM A 48M, Class 35B and shall be bare and not coated with paint or other coatings. TWSI plates shall be parallel with the curb radius where applicable, which will require the use of radius plates in some locations.

PART 3 **EXECUTION**

3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated material off site.
- .3 Place fill in maximum 150 mm layers and compact to at least 95% of Standard Proctor Maximum Dry Density (SPMDD) to ASTM D698.
- .4 Ensure that Sub Grade and Granular Base preparation has been inspected and approved by Contract Administrator before commencing work.

3.2 GRANULAR BASE

- .1 Obtain Contract Administrator approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular sub base to at least 100% of Standard Proctor Maximum Dry Density (SPMDD) to ASTM D698.

3.3 FORMING

- .1 Form vertical surfaces to full depth using forming material that will not deform under loading by plastic concrete.
- .2 Securely position forms to required lines and grades.
- .3 Coat forms with form release agent.
- .4 Obtain approval of forms before placing concrete.
- .5 Install metal fabrication as required.
- .6 Install rigid insulation at all barrier free doors.
- .7 Monolithic curb and sidewalk will not be allowed.

3.4 CONCRETE

- .1 Obtain Contract Administrator approval of granular base and reinforcing steel prior to placing concrete.

- .2 Do concrete work in accordance with OPSS 351 and OPSS.MUNI 353.
- .3 Finish exposed surface to a smooth, uniform finish, free of open texturing and exposed aggregate. Do not work more mortar to the surface than required. Do not use neat cement as a dryer to facilitate finishing.
- .4 Immediately after floating, give sidewalk surface uniform finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.
- .5 Provide edging as indicated with 10 mm radius edging tool.
- .6 Cure and protect concrete in accordance with OPSS 904.
- .7 No water may be added to the concrete on site or in transit. Concrete which is unworkable or that is too stiff to produce a satisfactory product shall be discarded.

3.5 TOLERANCES

- .1 Finish surfaces to within 3mm in 3m as measured with 3m straightedge placed on surface.

3.6 EXPANSION AND CONTRACTION JOINTS

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 1.5 m.
- .2 Install expansion joints at intervals of 6 m.
- .3 Install expansion joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .4 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

3.7 ISOLATION JOINTS

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints as indicated.

3.8 CURING

- .1 When the air temperature is less than 25 C, two layers of Terrafix 240R shall be carefully laid on the surface of the concrete. Strips shall overlap by 75 mm and shall be held down as required against displacement. The Terrafix 240R shall be maintained in place and kept thoroughly wet for a minimum of 24 hours.
 - .2 If the air temperature exceeds 25 °C, two layers of Terrafix 240R shall be used as a curing agent and shall be placed upon the concrete setting up, shall be then wetted and kept in a wet condition for 96 hours after the pour.
 - .3 During hot weather, the Contractor must cool down the forms and aggregate as outlined in OPSS.MUNI 904.
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3.9 BACKFILL

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material approved by Contract Administrator. Compact and shape to required contours as indicated or as directed by Contract Administrator.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 Drawings and general provisions of the Contract, including General Conditions and Division 1

1.2 SCOPE OF WORK

- .1 The work of this Section includes the provision of all labour, materials, equipment, and services required to install line painting on the bituminous asphalt pavement surfaces as indicated on the drawings, as specified herein and as required for a complete project.
This includes: Parking spaces, Snow Storage Area and Barrier-Free Symbols

1.3 REFERENCES

- .1 CAN/CGSB-1.5-M91, Low Flash Petroleum Spirits Thinner.
- .2 CGSB 1-GP-71, Method, of Testing Paints and Pigments.
- .3 CGSB 1.74-2001, Alkyd Traffic Paint

1.4 CERTIFICATION

- .1 Submit certification that the paint products proposed are recommended for use for pavement markings with vehicle traffic.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Paint:
 - .1 To CGSB 1.74-2001, alkyd traffic paint.
 - .2 Colours:
Yellow (505-308) parking Lines, Pedestrian walkways,
~~White: Stop Lines at stop signs, Dimensions to City of Ottawa Standards.~~
Blue & White: Barrier Free Symbol at each Parking Stall, to City of Ottawa Standards.
~~Green & White: Car Charging Symbol at each Parking Stall to City of Ottawa Standards.~~
- .2 Thinner: to CAN/CGSB-1.5.

PART 3 – EXECUTION

3.1 EQUIPMENT REQUIREMENTS

- .1 Paint applicator to be an approved pressure type distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.

3.2 CONDITION OF SURFACES

- .1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.3 APPLICATION

- .1 Lay out pavement markings for approval of Project Manager.
- .2 Unless otherwise approved by Consultant, apply paint only when air temperature is above 10°C, wind speed is less than 30 km/h and no rain is forecast within next 4 h.
- .3 Apply traffic paint evenly at rate of 3 m² /L.
- .4 Do not thin paint unless approved by Consultant.
- .5 Paint lines to be of uniform colour and density with sharp edges.
- .6 Thoroughly clean distributor tank before refilling with paint of different colour.

3.4 TOLERANCE

- .1 Paint markings to be within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings without damage to pavement.

3.5 PROTECTION OF COMPLETED WORK

- .1 Protect pavement markings until dry.

END OF SECTION

PART 1 General

1.1 SHOP DRAWINGS

- .1 Submit shop drawings for review in accordance with Section 01340, Shop Drawings, Product Data, Samples and Mock-ups. Clearly show components which are to be included in the work.

1.2 REFERENCE STANDARDS

- .1 Installation shall conform to CAN2-138.3-M80, to manufacturer's directions, and/or as specified hereinafter.

PART 2 Products

2.1 MATERIALS

- .1 Fabric
Chain link, hot dipped galvanized after weaving and vinyl coated (black), shall conform to CAN2-138.1-M80. 3.97 mm, 6-gauge (inclusive of vinyl coating) steel wire woven in a 50 mm (2") mesh. Top and bottom selvage shall have a knuckled finish. Colour of fabric shall be black.
- .2 Line Posts
Shall conform to CAN2-138.2-M80 + Amdt -JUNE, 82, 60 mm (2-3/8") O.D., standard butt-weld Schedule 40 pipe, galvanized.
- .3 Terminal Posts
Shall conform to CAN2-138.2-M80 + Amdt -JUNE, 82, end, corner and straining posts, 89 mm (3-1/2") O.D., standard butt weld Schedule 40 pipe, galvanized.
- .4 Line Post Tops
Galvanized pressed steel, malleable iron or cast. Tops shall accommodate top rails in horizontal position.
- .5 Top Rail
Shall conform to CAN2-138.2-M80 + Amdt -JUNE, 82, 43 mm (1-11/16") O.D., galvanized pipe, plain ends, random lengths, standard butt-weld Schedule 40 pipe.
Galvanized couplings of the outside sleeve type at least 180 mm (7") in length will be used to joint the top rail. The top rail shall pass through line post top and form a continuous brace for each stretch of fence. The top rail shall be secured to each terminal post with receptacle fittings.
- .6 Braces
43 mm (1-11/16") O.D. galvanized. Shall be same specifications as for top rail. Horizontal brace shall be spaced mid-way between top rail and bottom of fence and shall extend from terminal post to first adjacent line post. End posts shall have one (1) brace. Corner and straining posts shall have two (2) braces.
- .7 Fittings
Hot dipped, galvanized, pressed steel, aluminum, or non-metallic mouldings of sufficient strength to ensure the integrity of the fence.
- .8 Fabric Bands
Fabric shall be fastened to top rail and braces with suitable vinyl coated (black) galvanized tie wire at approximately 450 mm (18") intervals between line posts. Fabric shall be secured to line posts at approximately 300 mm (12") intervals.
- .9 Tension Wire

5 mm, vinyl coated single strand galvanized steel wire shall be stretched taut along the bottom of the fabric and fastened at intervals of approximately 450 mm (18").

.10 Gates

- .1 Gate frames shall be made of 43 mm (1-11/16") O.D., galvanized steel pipe. Frames shall be electrically welded at all joints. Gate shall be diagonally braced.
- .2 Gates shall be supplied complete with galvanized, malleable, iron hinges, latch, and latch catch, complete with padlock hasp. Double gates shall have centre rest with iron foot for closed position and chain hold-open when open. Gate latches shall be suitable for a padlock which can be attached and operated from either side of gate.
- .3 Hinges shall permit gate to swing 180 degrees. Gate braces shall be 33 mm (1-5/16") O.D., galvanized steel pipe.

.11 Finish

- .1 All fence components such as posts, gates, frames, braces, fittings, rails, hardware and accessories, etc., shall be galvanized 1.6 oz. smooth coat (not hot dipped) conforming to:
 - .1 For pipe 550 g/m², minimum to ASTM A90-81.
 - .2 For other fittings: to CSA G164-M1960.
- .2 All fence components shall be provided with an electrostatic finish, colour black.

.12 Concrete

- .1 Concrete mix designed to produce 20 MPA minimum compressive strength at twenty-eight (28) days and containing 20 mm maximum size, 5 mm minimum size coarse aggregate, with water/cement ratio to CAN3-A23.1-M77 Table 7 for Class A exposure and 60 mm slump at time and point of deposit. Air entrainment to CAN3-A23.1-M77 Table 8.
- .2 Sono Tubes: sizes to be 300 mm for line posts and 400 mm for corners, gate end and restraining posts. Length as per details.

PART 3 Execution

3.1 INSTALLATION OF CHAIN LINK FENCE

- .1 Install 1525 mm high fencing in locations indicated on the drawings.
- .2 Erect fencing plumb, level, true to line and as indicated on drawings. Location of posts shall be at maximum 3 meter (10'-0") intervals. Place at closer intervals as required to suit curved sections and/or recommended manufacturer's standards.
- .3 Drill or dig post holes to receive concrete footings to depths and sizes required. Where post holes are to be drilled into rock, provide minimum 150 mm dia. hole to receive posts to depth as required. Extend concrete encasement of posts to grade level. For diameter of typical encasement/foundation refer to details.
- .4 Concrete footings shall be 1400 mm deep for line posts and centre rest, 1600 mm deep for terminal, corner restraining and gate posts. Footings shall be 300 mm (12") diameter at the base and 250 mm (10") diameter at the top for line posts. Footings shall be 350 mm

(14") diameter at the base and 300 mm (12") diameter at the top for terminal posts. Concrete shall be 27 MPA at twenty-eight (28) days and shall be finished convex around posts, and be flush with finished grade.

- .5 Install chain link fabric in accordance with manufacturer's directions.
- .6 Make good any damage incurred during chain installation of fence.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 31 23 33 – Excavating, Trenching, and Backfilling
- .2 Section 32 92 23 - Sodding

1.2 **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, installation instructions and warranty requirements.

1.3 **SOURCE QUALITY CONTROL**

- .1 Advise Contract Administrator of sources of topsoil to be utilized seven (7) working days in advance of stating time.
- .2 Contractor is responsible for soil analysis and requirements for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.

PART 2 **PRODUCTS**

2.1 **TOPSOIL**

- .1 Topsoil for sodded areas: imported, screened, topsoil with a mixture of mineral particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20% to 70% sand, minimum 7% clay, and contain 2 to 10 % organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Free from:
 - .1 Debris and stones over 25 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .4 Consistence: friable when moist.

2.2 **SOIL AMENDMENTS**

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
 - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
 - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
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- .6 Ph value: 6.5 to 8.0.
- .2 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5 mm.
- .3 Sand: washed coarse silica sand, medium to coarse textured.
- .4 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .5 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

PART 3 **EXECUTION**

3.1 **STRIPPING OF TOPSOIL**

- .1 As per Section 31 23 33 – Excavating, Trenching and Backfilling.

3.2 **PREPARATION OF EXISTING GRADE**

- .1 Verify that grades are correct. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 50 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Course cultivate entire area which is to receive topsoil to minimum depth of 100 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 **PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL**

- .1 Place topsoil after Contract Administrator has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.
- .3 For sodded areas keep topsoil below finished grade.
- .4 Spread topsoil as indicated to following minimum depths after settlement and 80% compaction:
 - .1 100 mm for sodded areas.

- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Contract Administrator. Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

- .1 Contract Administrator will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading. Approval of topsoil material subject to soil testing and analysis.
- .2 Testing of topsoil will be carried out by testing laboratory designated by Contract Administrator. Soil sampling, testing and analysis to be in accordance with Provincial regulations and standards. Contract Administrator will pay for cost of tests as specified in Section 01 45 00 – Quality Control.

3.6 SURPLUS MATERIAL

- .1 Dispose of surplus or unsuitable material off site or as directed by Contract Administrator.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 32 91 19 - Topsoil Placement and Grading.

1.2 **SUBMITTALS**

- .1 Provide product data for:
 - .1 Seed
 - .2 Mulch
 - .3 Tackifier
 - .4 Fertilizer
- .2 Submit in writing to Contract Administrator seven (7) working days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.
 - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.3 **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, installation instructions and warranty requirements.

1.4 **SCHEDULING**

- .1 Schedule hydraulic seeding to coincide with preparation of soil surface.

1.5 **WARRANTY**

- .1 All areas hydroseeded under this contract shall have a warranty period of two (2) years from the date of Substantial Performance and shall cover any defects in materials and workmanship or damages caused by the elements of weather. All defects shall be repaired to the satisfaction of the Contract Administrator at no cost to the owner.
- .2 End-of-warranty inspection will be conducted by Owner.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
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- .1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .1 Contractor to submit mixture composition to Contract Administrator for approval.
- .2 Mulch: Specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 800-900%.
 - .2 Type II mulch:
 - .1 Made from newsprint, raw cotton fibre and straw, processed to produce fibre lengths of 15mm minimum and 25mm maximum. Greater proportions of ingredients to be straw.
- .3 Tackifier: Water dilutable, liquid dispersion.
- .4 Water: Free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.

PART 3 **EXECUTION**

3.1 **WORKMANSHIP**

- .1 Do not spray onto structures, signs, plant material, utilities and other than intended surfaces.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Contract Administrator.
- .3 DO not perform work under adverse conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .4 Protect seeded areas from trespass until plants are established.

3.2 **PREPARATION OF SURFACES**

- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
 - .2 Cultivated areas identified as requiring cultivation to depth of 25 mm.
 - .3 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
 - .4 Obtain Contract Administrator approval of grade and topsoil depth before starting to seed.
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3.3 FERTILIZING PROGRAM

- .1 Fertilize prior to fine grading incorporating fertilizer equally distributed in accordance with an agreed program between Contractor and Contract Administrator.
- .2 Fertilize during establishment and warranty periods to an agreed program between Contractor and Contract Administrator.

3.4 PREPARATION OF SLURRY

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Contract Administrator. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.5 SLURRY APPLICATION

- .1 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
 - .3 Pumps capable of maintaining continuous non-fluctuating flow of solution.
 - .4 Supplied with not less than 6 spray pattern nozzles.
 - .5 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
 - .6 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .2 Slurry mixture applied per hectare.
 - .1 Seed: Grass mixture 150kg.
 - .2 Mulch: Type I 1250 kg.
 - .3 Tackifier: 20 kg.
 - .4 Water: Minimum 30,000 L.
 - .5 Fertilizer: 600 kg, ratio 5-20-20.
- .3 Apply slurry uniformly, at optimum angle of application to adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300 mm into adjacent grass areas or sodded areas to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.

- .7 Protect seeded areas from trespass satisfactory to Contract Administrator.
- .8 Remove protection devices as directed by Contract Administrator.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of seed application until acceptance by Contract Administrator.
- .2 Grass mixture:
 - .1 Repair and re-seed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Mow grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Contract Administrator.
 - .3 Fertilize seeded areas 10 weeks after germination provided plants have mature true leaves in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .4 Control weeds by manual, mechanical or chemical means. Utilizing acceptable integrated pest management practices.
 - .5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.7 ACCEPTANCE

- .1 Seeded areas will be accepted by Contract Administrator provided that:
 - .1 Plants are uniformly established. Seeded areas are free of rutted, eroded, bare or dead spots.
 - .2 Areas have been mown at least twice.
 - .3 Areas have been fertilized.
- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.8 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations until acceptance of Substantial Performance.
 - .1 Water seeded area to maintain optimum soil moisture level for continued growth. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to satisfaction of Contract Administrator.
 - .3 Mow areas seeded, remove clippings, as directed by Contract Administrator.
 - .4 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .5 Eliminate weeds by mechanical or chemical means.
 - .6 At the end of the warranty period, repeat items 2-5.

3.9 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED WORK**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 32 91 19 - Topsoil Placement and Grading.

1.2 **SUBMITTALS**

- .1 Submit:
 - .1 Sod for each type specified.
 - .1 Install approved samples in one square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.
 - .2 Bio-degradable geotextile fabric.
- .2 Obtain approval of samples by Contract Administrator.

1.3 **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.

1.4 **SCHEDULING**

- .1 Schedule sod installation when frost has left ground and preferably before June 15 or between August 15 and September 30.
- .2 Schedule sod laying to coincide with preparation of soil surface.

1.5 **WARRANTY**

- .1 For sodding, 12 months warranty period is extended to 24 months.
- .2 Contractor hereby warrants that sodding will remain free of defects in accordance with General Conditions CCDC GC 12.3, but for 24 months. Any deficient sod is to be replaced at no cost to the Owner.
- .3 End-of-warranty inspection will be conducted by Owner.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.
 - .1 Number one Named Cultivars: Nursery Sod grown from certified seed.
 - .2 Turf Grass Nursery Sod Quality:
 - .1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.

- .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
- .3 Mowing height limit: 35 to 65 mm.
- .4 Soil portion of sod: 6 to 15 mm in thickness.
- .2 Sod establishment support:
 - .1 Wooden pegs: 19 x 19 x 300mm.
- .3 Water:
 - .1 Supplied by Contractor.
 - .2 Potable, free of impurities.
- .4 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain approval from Contract Administrator of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 19 - Topsoil Placement and Grading. If discrepancies occur, notify Contract Administrator.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 8 mm, for Turfgrass Nursery Sod, and plus or minus 15 mm for commercial grade turfgrass nursery, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 25 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site in location as directed by Contract Administrator.
- .5 Cultivate fine grade approved by Contract Administrator to 25mm depth immediately prior to sodding.

3.2 SOD PLACEMENT

- .1 Lay sod within 24 hours of being lifted.
- .2 Lay sod sections in rows, longitudinally, along contours of slopes, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

- .3 Roll sod as directed by Contract Administrator. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.
- .4 Peg sod on slopes of 3 horizontal to 1 vertical and steeper, within 1 m of catch basins and ditch inlets, and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes
 - .2 Not less than 3-6 pegs per square metre in slopes.
 - .3 Not less than 6-9 pegs per square metre in drainage structures.
 - .4 Drive pegs to 20 mm above soil surface of sod sections.

3.3 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods to following program agreed to by Contract Administrator.

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
- .2 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings as directed by Contract Administrator.
- .3 Maintain sodded areas weed free by mechanical means.
- .4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
- .5 Repair and resod dead or bare spots to allow establishment of sod prior to acceptance.

3.5 ACCEPTANCE

- .1 Sod areas will be accepted by Contract Administrator provided that:
 - .1 Sodded areas are properly established after 30 days.
 - .2 Sod is free of bare and dead spots, and without weeds.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times, and within 24 h prior to acceptance.
 - .5 Fertilizing in accordance with fertilizer program has been carried out at least once.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.
- .3 When environmental conditions allow, all sodded areas showing shrinkage cracks shall be top-dressed and seeded with a seed mix matching the original.

3.6 MAINTENANCE DURING WARRANTY PERIOD

- .1 From time of acceptance until end of warranty period, water sod areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.
- .2 Repair and re-sod dead or bare spots to satisfaction of Contract Administrator.
- .3 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
- .4 Eliminate weeds by mechanical means to extent acceptable to Contract Administrator.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Materials and installation for constructing new outfall structures, precast and cast-in-place manholes, catch basins and ditch inlets.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 05 16 - Aggregate Materials.
- .3 Section 31 23 33 - Excavation, Trenching and Backfilling.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM International).
 - .1 ASTM A48/A48M, Standard Specification for Gray Iron Castings.
 - .2 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM C478M, Specification for Precast Reinforced Concrete Manhole Sections Metric.
 - .4 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .5 ASTM D2240, Standard Test Method for Rubber Property-Durometer Hardness.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International).
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
 - .3 CAN/CSA-A165 Series, CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
 - .4 CSA A3000 "Cementitious Materials Compendium".
- .4 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD) by the Ontario Ministry of Transportation.

1.4 **SUBMITTALS**

- .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.
 - .2 Submit oil & grit interceptor sizing report and manufacturer's drawings at least 4 weeks prior to beginning Work.
-

1.5 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.
- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Precast manhole units: to OPSD 701.010, 701.011.
- .2 Precast catchbasin: to OPSD 705.010
- .3 Joints: to be made watertight using rubber rings, bituminous compound, epoxy resin cement or cement mortar.
- .4 Mortar:
 - .1 Aggregate: to CSA A82.56.
 - .2 Cement: to CAN/CSA-A8.
- .5 Ladder rungs: to OPSD 405.010.
- .6 Adjusting rings: to OPSD 704.010.
- .7 Frames, gratings, covers to dimensions as indicated and following requirements:
 - .1 Storm manholes: to OPSD 401.010, open
 - .2 Catchbasin manholes: to OPSD 400.070
 - .3 Catchbasin: to OPSD 400.020
- .8 Granular bedding and backfill: Granular 'A' as per OPSS.MUNI 1010.
- .9 Unshrinkable Fill: in accordance with Section 31 23 10 – Excavation, Trenching and Backfilling.
- .10 Catchbasins and manholes shall come equipped with two knockouts for 3 m long - 150mmø subdrains as per OPSS 1840 c/w knitted geotextile sock, set at same elevation as the outlet.
- .11 Geotextile sock: to OPSS 1860.

PART 3 EXECUTION

3.1 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 33 - Excavating Trenching and Backfilling and as indicated.
 - .2 Obtain approval of Contract Administrator before installing, manholes or ditch inlets.
-

3.2 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.
- .3 Dewater excavation to approval of Contract Administrator and remove soft and foreign material before placing concrete base.
- .4 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% corrected maximum dry density.
- .5 Precast units:
 - .1 Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base. Make each successive joint watertight with Contract Administrator approved rubber ring gaskets, bituminous compound, cement mortar, epoxy resin cement, or combination thereof.
 - .2 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
- .6 Compact granular backfill to 100% Standard Proctor Maximum Dry Density (SMPDD). Granular backfill shall extend from the base of the structure to 300 mm above the inlet pipe obvert.
- .7 Place unshrinkable backfill in accordance with Section 31 23 33 - Excavating, Trenching and Backfill.
- .8 Set frame and cover to required elevation such that the distance from the top of manhole cover to the first ladder rung is less than 450 mm. If adjustment is required use concrete rings, pare and make smooth and watertight.
- .9 Place frame and cover on top section to elevation as indicated prior to final lift of asphalt. If adjustment required use concrete ring.
- .10 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.
- .11 Install perforated pipe to catch basin and manholes on both sides of each structure and connect to structure. Install two (2) 3 m long subdrains per structure.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED WORK**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 31 05 16 - Aggregate Materials.
- .4 Section 31 23 33 - Excavating Trenching and Backfilling.
- .5 Section 33 05 16 – Precast Structures

1.2 **REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM B745/745M, Standard Specification of Corrugated Aluminum Pipes for Sewers and Drains.
 - .2 ASTM D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- .2 Canadian General Standards Board (CGSB). CSA B137, Thermoplastic Pressure Piping Compendium.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
 - .1 CAN/CSA-A5, Portland Cement.
 - .2 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).
 - .2 CSA B182.8, Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings
- .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS Sections 401, 403, 405, 409, 410, 412, MUNI 1841

1.3 **DEFINITIONS**

- .1 Pipe section is defined as length of pipe between successive manholes and/or between manhole and any other structure which is part of sewer system.

1.4 **SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittals.
 - .2 Inform Contract Administrator at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.
 - .3 Submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.
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- .4 Ensure certification is marked on pipe.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.6 SCHEDULING

- .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
- .3 Notify Contract Administrator and plant superintendent two (2) working days in advance of any interruption in service.

PART 2 PRODUCTS

2.1 STORM SEWERS

- .1 Less than or equal to 450 mm Ø:
 - .1 PVC SDR 35 as per ASTM A2412 and in compliance with CSA B182.2 and ASTM A3034. Pipe stiffness minimum 320 kPa. Pipe joints to be bell and spigot with rubber gaskets.
- .2 Greater than 450 mm Ø:
 - .1 PVC SDR 35 as per ASTM A2412 and in compliance with CSA B182.2 and ASTM A3034. Pipe stiffness minimum 320 kPa. Pipe joints to be bell and spigot with rubber gaskets, OR.
 - .2 Reinforced concrete Class 65-D (or greater, as required), to CSA A257.2.

2.2 SUBDRAIN

- .1 Perforated Polyethylene pipe per OPSS 1840, minimum 210 kPa stiffness covered with a knitted geotextile sock per OPSS 1860.

2.3 POLYETHYLENE CATCHBASIN

- .1 300mm diameter HDPE to CSA B182.8 with a single outlet complete with integral gasket and cast iron gate.

2.4 PIPE BEDDING, COVER, AND SURROUND MATERIAL

- .1 Granular 'A' as per OPSS.MUNI 1010 and Section 31 23 33 – Excavating, Trenching, and Backfilling.

2.5 BACKFILL MATERIAL

- .1 Select Subgrade material to OPSS.MUNI 1010.

2.6 INSULATION

- .1 50mm thick extruded Polystyrene foam, minimum compressive strength 275kPa as per ASTM D 1621-73. Standard of acceptance:
 - .1 D.O.W HI-40,
 - .2 Owens Corning Foamular C400;

PART 3 EXECUTION

3.1 PREPARATION

- .1 Clean and dry pipes and fittings before installation.
- .2 Obtain approval of pipes and fittings from Contract Administrator prior to installation.

3.2 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling.
- .2 Do not allow contents of any sewer or sewer connection to flow into trench.
- .3 Trench alignment and depth require approval of Contract Administrator prior to placing bedding material and pipe.

3.3 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding materials in uniform layers not exceeding 150 mm compacted thickness to depth indicated.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95% of Standard Proctor Maximum Dry Density (SPMDD).
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material.

3.4 INSTALLATION

- .1 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Contract Administrator.
 - .2 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Tolerances: 3mm in 3 m.
 - .3 Do not exceed maximum joint deflection recommended by pipe manufacturer.
 - .4 Do not allow water to flow through pipe during construction, except as may be permitted by Contract Administrator.
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- .5 Make watertight connections to manholes/catchbasins using non-shrink grout when suitable gaskets are not available.

3.5 PIPE SURROUND AND COVER

- .1 Place surround material in unfrozen condition.
- .2 Hand place surround material in uniform layers not exceeding 200 mm compacted thickness as indicated. Do not dump directly on pipe.
- .3 Place layers uniformly and simultaneously on each side of pipe.
- .4 Install insulation as indicated on Contract Drawings.

3.6 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated. Backfill material is to be compacted to at least 95% of SPMDD.

3.7 FIELD TESTING OF SEWERS

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 When directed by Contract Administrator, draw metal mandrel 95% of inside diameter of pipe through sewer to ensure pipe is free of obstructions or deflections.
- .3 Carry out CCTV camera inspection on each section of sewer.
- .4 Provide colour digital video (USB) inspection for sewers (2 copies of video and report). Report to document condition of sewer to satisfaction of Contract Administrator. Cost of inspection to be paid by Contractor.
- .5 Repair and retest sewer sections as required, until test results are acceptable.
- .6 Repair visible leaks regardless of test results.
- .7 Obtain a letter of compliance from the Client and submit to Contract Administrator.

END OF SECTION