

ARCHITECTURAL SPECIFICATION



1 & 3 Meridian Place, Ottawa

The Meridian Community Building Rebuild Issued for Tender

**Hobin Architecture Incorporated
63 Pamilla Street Ottawa**

SECTION **TITLE**

DIVISION 00 – FRONT END

00 01 10 Index 2 Pages

DIVISION 01 - GENERAL REQUIREMENTS

01 29 00 Payment Procedures 3 Pages
01 29 83 Payment Procedures: Testing Laboratory Services 2 Pages
01 31 19 Project Meetings 3 Pages
01 33 00 Submittal Procedures 5 Pages
01 35 29 Health and Safety Requirements 3 Pages
01 35 45 Indoor Air Quality During Construction 5 Pages
01 45 00 Quality Control 4 Pages
01 51 00 Temporary Utilities 4 Pages
01 52 00 Construction Facilities 5 Pages
01 56 00 Temporary Barriers and Enclosures 3 Pages
01 61 00 Common Product Requirements 5 Pages
01 71 00 Examination & Preparation 3 Pages
01 73 00 Execution 3 Pages
01 74 11 Cleaning 3 Pages
01 74 21 Construction / Demolition Waste Management and Disposal 8 Pages
01 77 00 Closeout Procedures 2 Pages
01 78 00 Closeout Submittals 8 Pages
01 79 00 Demonstration and Training 3 Pages
01 91 13 General Commissioning (CX) Requirements 11 Pages

DIVISION 03 - CONCRETE

03 45 00 Precast Architectural Concrete 9 Pages

DIVISION 04 - MASONRY

04 05 00 Common Work Results for Masonry 8 Pages
04 05 12 Mortar and Masonry Grout 7 Pages
04 05 19 Masonry Anchorage and Reinforcing 7 Pages
04 05 23 Masonry Accessories 5 Pages
04 21 13 Brick Masonry 5 Pages

DIVISION 05 - METALS

05 50 00 Metal Fabrications 7 Pages

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 10 00 Rough Carpentry 5 Pages
06 11 13 Engineered Wood Products 1 Page
06 20 00 Finish Carpentry 10 Pages
06 40 00 Architectural Woodwork 12 Pages

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 21 13	Board Insulation	5	Pages
07 21 16	Blanket Insulation	4	Pages
07 21 29	Spray in Place Foam Insulation	6	Pages
07 24 00	EIFS/Proprietary Systems – Dryvit Systems Canada	18	Pages
07 27 00	Air Barriers	7	Pages
07 27 19	Vapour Barriers	1	Pages
07 31 13	Asphalt Shingles	1	Page
07 46 33.1	Vinyl Siding and Soffits	6	Pages
07 52 00	Modified Bituminous Membrane Roofing	15	Pages
07 62 00	Sheet Metal Flashing and Trim	4	Pages
07 72 13	Roof Hatches	6	Pages
07 84 00	Fire Stopping	10	Pages
07 92 00	Joint Sealants	9	Pages

DIVISION 08 - OPENINGS

08 00 00	Door Schedule Legend	1	Page
08 11 00	Metal Doors and Frames	8	Pages
	Installation Tolerance Drawings	3	Pages
08 11 16	Aluminum Doors and Frames	8	Pages
08 14 16	Flush Wood Doors	6	Pages
08 35 13.3e	Accordion Folding Partitions	4	Pages
08 32 50	Balcony Doors	5	Pages
08 50 10	Aluminum Clad Wood Windows	10	Pages
08 71 00	Door Hardware	19	Pages
08 80 50	Glazing	10	Pages
08 90 00	Louvers and Vents	5	Pages

DIVISION 09 - FINISHES

09 00 00	Room Finish Schedule Legend	2	Pages
09 21 16	Gypsum Board Assemblies	11	Pages
09 51 13	Acoustical Ceiling Panel	4	Pages
09 53 00	Acoustical Suspension Grid	3	Pages
09 65 19	Resilient Flooring	7	Pages
09 65 50	Resilient Tile and Base	8	Pages
09 68 00	Tile Carpeting	10	Pages
09 91 13	Exterior Painting	12	Pages
09 91 23	Interior Painting	16	Pages

DIVISION 10 - SPECIALTIES

10 00 00	Manufactured Specialties	1	Page
10 28 10	Toilet and Bathroom Accessories	5	Pages

END OF SECTION

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 Owner/Contractor Agreement.
 - .2 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008 Stipulated Price Contract.
 - .2 CCA 1-2008, Stipulated Price Contract.
- 1.2 APPLICATIONS FOR PROGRESS PAYMENT
- .1 Refer to CCA 1, CCDC 2
 - .2 Make applications for payment on account as provided in Agreement 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 CCA 1, CCDC 2
 - .2 Provide detailed 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 CCA 1, CCDC 2
- .2 Consultant will issue to Owner, no later than 10 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 CCA 1, CCDC 2
- .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 No later than 10 days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than 7 days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.
- .4 Consultant: state date of Substantial Performance of Work or designated portion of Work in certificate.
- .5 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.7 PAYMENT OF
HOLDBACK UPON
SUBSTANTIAL
PERFORMANCE OF WORK

- .1 Refer to CCA 1, CCDC 2
- .2 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.

- .3 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of holdback amount.
- .4 Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in lien legislation applicable to Place of Work. Where lien legislation does not exist or apply, holdback amount is due and payable in accordance with other legislation, industry practice, or provisions which may be agreed to between parties. Owner may retain out of holdback amount sums required by law to satisfy liens against Work or, if permitted by lien legislation applicable to Place of Work, other third party monetary claims against Contractor which are enforceable against Owner.

1.8 FINAL PAYMENT

- .1 Refer to CCDC 2, GC 5.7
- .2 Refer to CCA 1-2008, 6.1.3.

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 RELATED
REQUIREMENTS**

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Consultant are specified under sections as follows:
- .1 Concrete
 - .2 Masonry
 - .3 Steel
 - .4 Granular Fills

**1.2 APPOINTMENT AND
PAYMENT**

- .1 Developer will appoint and pay for services of testing laboratory except as follows:
- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under supervision of Consultant.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Consultant to verify acceptability of corrected work.

**1.3 CONTRACTOR'S
RESPONSIBILITIES**

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work for inspection and testing.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Consultant 48 hours minimum sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Consultant.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work on a bi-weekly basis or at the call of Consultant.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Consultant.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance and Consultant.
- .8 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 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of Owner, Consultant Team, 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 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .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.

1.3 PROGRESS MEETINGS

.1 During course of Work and 4 weeks prior to project completion, schedule progress meetings twice per month or as requested.

.2 Contractor, major Subcontractors involved in Work and Owner Representative and Consultant and Owner 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 2 days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

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 RELATED
REQUIREMENTS**

.1 Section - All Sections.

1.2 ADMINISTRATIVE

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

.2 Do not proceed with Work affected by submittal 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 GC to 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 co-ordinated.

.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 Refer to CCDC 2 GC 3.10.

.2 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.

- .3 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow 10 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 and submission number
 - .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 include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.

- .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .10 After Consultant's review, distribute copies.
- .11 Submit 1 print set and an electronic copy of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
- .12 Submit 1 electronic copy 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. Provide all documents in PDF format (.pdf)
- .13 Submit 1 electronic copy 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.
 - .3 Provide all documents in PDF format (.pdf)
- .14 Submit 1 electronic copy 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.
 - .3 Provide all documents in PDF format (.pdf)
- .15 Submit 1 electronic copy of manufacturer's 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.
 - .2 Provide all documents in PDF format (.pdf)
- .16 Submit 1 electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant. Provide all documents in PDF format

- .17 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .18 Submit 1 electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant.
- .19 Delete information not applicable to project.
- .20 Supplement standard information to provide details applicable to project.
- .21 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, 1 electronic copy 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.
- .22 The review of shop drawings by the Consultants is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Consultants approve 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 in duplicate 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.

1.6 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg & tif format, fine resolution monthly with progress statement and as directed by Consultant.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 4 locations.
 - .1 Viewpoints and their location as determined by Consultant.
- .4 Frequency of photographic documentation: twice weekly and as directed by Consultant.
 - .1 Upon completion of: demolition, framing and services before concealment, of Work, and as directed by Consultant.

1.7 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 1990 Updated 2011.

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 found in work plan.
- .3 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Consultant bi-weekly (2 times per month).
- .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 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 6 days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within 10 days after receipt of comments from Consultant.
- .8 Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

		.1	Fire Alarm Testing and Evacuation Program implemented by the CLIENT.
<u>1.3 FILING OF NOTICE</u>	.1		File Notice of Project with Provincial authorities prior to beginning of Work.
<u>1.4 SAFETY ASSESSMENT</u>	.1		Perform site specific safety hazard assessment related to project.
<u>1.5 REGULATORY REQUIREMENTS</u>	.1		Do Work in accordance with Section 01 41 00 - Regulatory Requirements.
<u>1.6 PROJECT/SITE CONDITIONS</u>	.1		Work at site will involve contact with: .1 Materials referenced in the attached Designated Substance Survey.
<u>1.7 GENERAL REQUIREMENTS</u>	.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.
		.2	Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
<u>1.8 RESPONSIBILITY</u>	.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.
<u>1.9 COMPLIANCE REQUIREMENTS</u>	.1		Comply with Ontario Health and Safety Act, R.S.O.
<u>1.10 UNFORSEEN HAZARDS</u>	.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 Consultant verbally and in writing.
<u>1.11 HEALTH AND SAFETY CO-ORDINATOR</u>	.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 demolition and asbestos.
- .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.

1.12 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, and in consultation with Consultant.

1.13 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.
- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 BLASTING

- .1 Blasting or other use of explosives is not permitted .

1.15 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Owner.

1.16 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.

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 Summary

- .1 Implementation of a Construction Indoor Air Quality (IAQ) Management Plan for the duration of the Work

1.2 References

- .1 Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 - .1 IAQ Guideline for Occupied Buildings under Construction, 2nd Edition, November 2007
 - .2 American National Standards Institute (ANSI)/ASHRAE Standard 52.2-1999: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

1.3 Definitions

- .1 Construction IAQ Management Plan: Outlines measures to minimize contamination in a specific project building during construction and/or describe procedures to flush the building of contaminants prior to occupancy.
- .2 HVAC Systems: Equipment, distribution systems, and terminals that provide the processes of heating, ventilating, or air-conditioning. (ASHRAE 90.1-2007)
- .3 Indoor Air Quality (IAQ): The nature of air inside a building that affects the health and well-being of building occupants. It is considered acceptable when there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction. (ASHRAE 62.1-2007).
- .4 Minimum Efficiency Reporting Value (MERV): A filter rating established by the ASHRAE 52.2-1999. MERV categories range from 1 (very low efficiency) to 16 (very high efficiency).

1.4 Submittals

- .1 IAQ Management Plan
 - .1 Prepare and submit one electronic copy of a Construction IAQ Management Plan within 28 calendar days of contract award for review by the consultant.
 - .2 Proposed IAQ management methods, techniques, or strategies to address all five SMACNA approaches.
 - .3 Proposed inspection procedures and forms to ensure compliance throughout construction.
 - .4 One copy of the Construction IAQ inspection report checklist.
 - .1 Checklist to contain descriptions of review procedure for checking each potential indoor air quality hazard.

- .5 Final plan to be submitted within 28 calendar days of receiving the Consultants review comments.
 - .1 Final plan to incorporate review comments provided by the consultant in order to ensure compliance with this specification.
- .2 Monthly Submissions Requirements
 - .1 Inspection checklists of IAQ management measures
 - .1 Inspection reports to be coordinated with photographs provided
 - .2 Inspection reports to indicate areas of the project inspected
 - .2 Photographs of SMACNA approaches implemented
 - .1 All five SMACNA approaches must be implemented and documented in each monthly submission.
 - .2 Clearly labelled with the SMACNA approach shown and include a brief description of the measure being documented
 - .3 Photographs to be date-stamped (YYYY-MM-DD).
 - .3 Projects consisting of multiple buildings must provide an additional set of inspection checklists and photographs on a monthly basis for each additional
 - .1 Only applies to additional occupied buildings
- .3 HVAC System Start-Up
 - .1 Prior to system start-up, submit written notice to the consultant when permanently installed air handling units are to be operated during construction.

Part 2 Products

2.1 Air Filtration Media

- .1 In accordance with the technical specification sections related to air filtration media.
 - .1 Air handling equipment operated during the construction phase to be fitted with air filtration media of minimum MERV 8 efficiency at all return air grilles.
 - .2 Replace air filters immediately prior to occupancy with MERV 13 filter media in accordance with ASHRAE 52.2.
 - .1 Exceptions are provided for units with 283 L/s (600 cfm) or less, subject to the units being fit-up with highest filtration media commercially available.

Part 3 Execution

3.1 General

3.2 Construction IAQ Management Plan

- .1 The intent of this plan is to prevent construction and future indoor air quality problems that may result from construction affecting the comfort and well-being of construction workers and building occupants.
- .2 The provision of the Construction Indoor Air Quality Management Plan or IAQ Management Plan is the responsibility of the trade contractor.
 - .1 These IAQ Plans shall be applicable for all buildings regardless of whether it is a new construction or renovation.
 - .2 Trade contractors to adhere to provincial regulations with respect to indoor and outdoor smoking.
 - .3 Protect all stored and installed absorptive materials from moisture or dust, chemical and gas damage.
 - .4 During construction use of air handling units, heat recovery ventilators, fans or any associated equipment and systems for ventilation, heating, de-humidification, humidification, dust control or any other use is permissible, provided that filters of MERV 8 or better are installed and maintained during operation.

3.3 Construction Reporting

- .1 Trade contractor to provide all reporting on a monthly basis to the General Contractor, unless otherwise approved in writing by the Consultant.
- .2 Identify indoor air quality efforts to all relevant trade contractors to ensure that the plan requirements are upheld.
 - .1 During construction, it is the General Contractor's responsibility to remind trade contractors of the plan requirements and confirm that the plan is implemented on site.
 - .2 Keep one hard-copy of the Indoor Air Quality Management Plan on site at all times.
- .3 Where indoor air quality issues remain unresolved for a period longer than two working days during construction
 - .1 General Contractor will address concerns in weekly meeting minutes and indoor air quality will be recorded as an agenda item.

3.4 SMACNA Guidelines for Construction IAQ

- .1 Complete the following activities specified to meet or exceed the recommended Design Approaches in Chapter 3 of the SMACNA IAQ Guidelines for Occupied Buildings under Construction - 1995 during all construction activities. These design approaches shall be applicable for all buildings regardless of whether it is a new construction or renovation:

- .1 HVAC Protection:
 - .1 Use of air handling units, heat recovery ventilators, fans or any associated equipment and systems for ventilation, heating, dehumidification, humidification, dust control is permissible during Construction, provided that filters of MERV 8 or better are installed during operation.
 - .2 Seal off all supply, return and exhaust air system openings to prevent the accumulation of dust and debris in the systems at all times unless work is being completed on the immediate area of the system using plastic seals to the approval of the Consultant. This is to include overnight and longer work stoppages. All diffusers, grilles, and displacement ventilators are also to be sealed in plastic.
 - .3 Keep all operable doors on all air handling units closed at all times unless work is being completed on the immediate area of the system.
 - .4 Do not store construction or waste materials in Fan and Mechanical Rooms.
 - .5 Keep all construction areas clean and neat.
 - .6 Where ducts become contaminated due to inadequate protection these ducts will be cleaned professionally as specified in the mechanical specification.
- .2 Source Control:
 - .1 Use of low VOC products, as specified elsewhere, at all times.
 - .2 Restrict traffic volume and idling of motor vehicles where emissions could be drawn into the building.
 - .3 Vent all construction heater products of combustion to the outdoors.
 - .4 Exhaust all pollution sources to the outside with portable fan systems ensuring exhaust does not re-circulate back into the building.
 - .5 Keep containers of VOC containing products closed when not in use
 - .1 Immediately remove empty containers from the building
- .3 Pathway Interruption:
 - .1 Prevent dust from migrating to other areas with the use of dust curtains or temporary enclosures where applicable.
 - .2 Relocate pollutant sources as far away as possible from construction ventilation equipment, stored materials and areas occupied by workers when feasible. Any construction supply and exhaust systems that ventilate both areas where pollutant sources are being used and areas where they are not been used should be shut down or isolated during such activity with supplemental construction ventilation provided as required.
 - .3 Isolate during construction, areas of work to prevent contamination of clean or occupied areas. Utilize pressure

- differentials generated by mechanical means to prevent contaminated air from entering clean areas.
- .4 Ventilate contaminated air from construction areas directly to the outside during installation of VOC emitting materials.4.
- .4 Housekeeping:
- .1 Remove contaminants from the building prior to operation of any permanent ventilation equipment.
 - .2 Keep all coils, filters, fans and ductwork clean during installation as specified and clean all prior to performing the Testing, Adjusting and Balancing of the systems.
 - .3 During construction suppress dust with wetting agents or sweeping compounds. Use efficient and effective dust collecting methods such as a damp cloth, wet mop, and vacuums with particulate filters, or wet scrubbers.
 - .4 Remove accumulations of water inside the building during construction. Protect all porous materials such as insulation and ceiling tile from exposure to moisture.
 - .5 General Contractor is obliged to enforce site cleanliness which is the trade consultant responsibility to keep project site clean. In order to eliminate the contamination of finished spaces from ongoing construction activities or where entrapped debris and dust may adversely affect indoor air quality in the finished building.
 - .6 Protect all porous materials from exposure to moisture.
- .5 Scheduling:
- .1 Schedule work to ensure dust emitting work does not coincide with installation of absorbent materials (ceiling tiles, gypsum wall board, fabric furnishings, carpet and insulation) that may act as 'sinks' for dust.
 - .2 Do not schedule any construction activities that would require the use of VOC or dust emitting activities during occupancy without the approval of the General Contractor.
 - .3 Schedule all use of VOC emitting and high odorous materials BEFORE installing absorbent materials (ceiling tiles, gypsum wall board, fabric furnishings, carpet and insulation, for example) that may act as 'sinks' for VOCs, odors and other contaminants.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section - All Divisions, All Sections
- 1.2 REFERENCES .1 Canadian Construction Documents Committee (CCDC)
.1 CCDC 2- 2008, Stipulated Price Contract.
- 1.3 INSPECTION .1 Refer to CCDC 2, GC 2.3.
- 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 Testing Allowance.
- .2 Unless alternate arrangements are made on a project specific basis, the Owner will engage and pay for independent testing and inspection, by agencies, including but not limited to the following:
.1 Exterior wall mock-up inspection including air vapour barrier membrane.
.2 Window and door mock-up inspection
.3 Window and door mock-up inspection
.4 Window and door field tests – water penetration
.5 Erosion and sediment control
.6 Compaction testing of backfill, road base and sub-courses, underslab fill and service trenches
.7 Asphalt mix testing
.8 Concrete mx design
.9 Concrete testing
.10 Masonry veneer wall mock-up inspection
.11 Roofing inspection (RCABC)
.12 Painting Inspection (MPI)
- .3 Co-ordinate access required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 Within fifteen (15) days of award of the Contract, the Contractor must submit to the design consultant a list of proposed independent inspection agencies for review and approval by the Owner, the design consultant, and the Owner.
- .6 Notify the Design Consultant, owner, and Testing Agency two (2) days prior to expected time for operations requiring inspection and testing. When test or inspections cannot be

performed, through the fault of the Contractor, the Contractor is responsible for reimbursing the Owner for additional costs incurred.

- .7 Submit PDF electronic copies of inspections and testing reports to each: The Owner, and Design Consultant.
- .8 Provide a hardcopy of inspections and test reports on site for all time.
- .9 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. The Contractor must pay all costs for retesting and reinspection.

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 Refer to CCDC, GC 2.4.
- .2 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.

1.8 REPORTS

- .1 Submit 1 electronic copy of inspection and test reports in PDF format to Consultant.
- .2 Provide copies to subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

1.9 TESTS AND MIX

- .1 Furnish test results and mix designs as requested.

DESIGNS

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 and as specified in specific Section.
- .3 Prepare mock-ups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work. Include mock-up inspection on the construction schedule/ Co-ordinate with regular site meetings if possible. Provide a minimum of two (2) days notice of mock-up inspections.
- .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 Mock-ups may remain as part of Work if approved by Consultant.
- .6 Construct full-size mock-ups on site of the following conditions in locations directed by the design consultant. Make changes to the mock-ups as directed by the Design Consultant and building envelope consultant. Mock-ups, once accepted, may be used in the finished work and will serve as a standard against which other work will be judged.
- .7 Mock-ups to include but not limited to:
 - .1 Exterior Wall Construction: including exterior wall finish, backup walls including strapping and thermal clips, wall cavities, flashings, air-vapour seal membranes, insulation, sealants, sheathing and sheathing membranes as applicable.
 - .2 Windows and Doors: include installed window frame, window anchors, glazing, flashings, air-vapour membrane seals, sealants as applicable and finished trim.
 - .3 Masonry mock-ups
- .8 Provide photographic documentation for mock-ups and include in Closeout Submittals. Do not cover over work and mock-ups until after photographs have been taken.

1.11 MILL TESTS

- .1 Submit mill test certificates as requested or as required of specification Sections.

1.12 EQUIPMENT AND
SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
- .2 Refer to Mechanical and Electrical drawings for specific sections and for definitive requirements.

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

<u>1.1 RELATED REQUIREMENTS</u>	.1	Electrical drawings.
<u>1.2 REFERENCES</u>	.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.
<u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u>	.1	Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Submit erosion and sedimentation control plan for the podium level..
<u>1.4 INSTALLATION AND REMOVAL</u>	.1	Provide temporary utilities controls in order to execute work expeditiously.
	.2	Remove from site all such work after use.
<u>1.5 DEWATERING</u>	.1	Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.
<u>1.6 WATER SUPPLY</u>	.1	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	Pay for utility charges at prevailing rates.
<u>1.7 TEMPORARY HEATING AND VENTILATION</u>	.1	Provide temporary heating required during construction period, including attendance, maintenance and fuel.
	.2	Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
	.3	Provide temporary heat and ventilation in enclosed areas as required to:

- .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
 - .5 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
 - .6 Permanent heating system of building, not to be used when available. Be responsible for damage to heating system if use is permitted.
 - .7 On completion of Work for which permanent heating system is used, replace filters, clean ductwork and all diffusers.
 - .8 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
 - .9 Pay costs for maintaining temporary heat, when using permanent heating system if available.
 - .10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
 - .11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.8 TEMPORARY POWER
AND LIGHT

- .1 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 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
- .3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of GC.
- .4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

1.9 TEMPORARY
COMMUNICATION
FACILITIES

- .1 Provide and pay for temporary telephone, fax, and data hook up lines equipment necessary for own use and use of Owner Representative and Consultant.

1.10 FIRE
PROTECTION

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 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 and sediment and erosion control drawings 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 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

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008, Stipulated Price Contract.
- .2 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.
- .3 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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit erosion and sedimentation control plan.

1.4 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 gravelled 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.

1.5 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging,

platforms and temporary stairs.

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|---------------------------------|----|--|
| <u>1.6 HOISTING</u> | .1 | Provide, operate and maintain hoists, 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. |
| <u>1.7 ELEVATORS</u> | .1 | Designated existing and permanent elevators not to be used by construction personnel and transporting of materials. |
| <u>1.8 SITE STORAGE/LOADING</u> | .1 | Refer to CCDC 2, GC 3.11. |
| <u>1.9 CONSTRUCTION PARKING</u> | .1 | Parking is not available on site. Arrange parking off site. |
| | .2 | Provide and maintain adequate access to project site. |
| <u>1.10 SECURITY</u> | .1 | Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays if required. |
| <u>1.11 OFFICES</u> | .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. |
| | .4 | Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue. |

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- .5 Equip office with 1 x 3 m table, 10 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
- .6 Maintain in clean condition.
- 1.12 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.
- 1.13 SANITARY
FACILITIES
- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.14 CONSTRUCTION
SIGNAGE
- .1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by Consultant.
- .2 Construction sign _2.4 m x 2.4 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.
- .3 Indicate on sign, name of Owner, Consultant and Contractor, of design style established by Consultant as detailed.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.
- .6 Locate project identification sign as directed by Consultant and construct as follows:
- .1 Build temporary concrete foundation, erect framework, and attach signboard to framing.
 - .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
 - .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.
- .8 Signs and notices for safety and instruction in both official

languages Graphic symbols to CAN/CSA-Z321.

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

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. Keep all local roads used by construction traffic clean and clear of mud, gravel, etc
- .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 Construct access and haul roads necessary.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .13 Provide snow removal during period of Work.

1.17 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.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 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 and sediment and erosion control drawings 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 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 INSTALLATION
AND REMOVAL**

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

1.2 HOARDING

- .1 Provide temporary site enclosures with chain link fencing or Modu-Loc fencing 1.8 metres high.
- .2 Provide lockable truck entrance gate gates and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .3 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- .4 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.

**1.3 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.
- .2 Provide as required by governing authorities.

**1.4 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 and snow loading.

**1.5 DUST TIGHT
SCREENS AND PARTITIONS**

- .1 Provide dust tight screens / insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work occupied and public areas. Screens must be structurally sound and impact resistant.
- .2 Maintain and relocate protection until such work is complete.

	.3	Screens will be required at all work abutting occupied spaces.
<u>1.6 ACCESS TO SITE</u>	.1	Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
<u>1.7 PUBLIC TRAFFIC FLOW</u>	.1	Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.
<u>1.8 FIRE ROUTES</u>	.1	Maintain access to property including overhead clearances for use by emergency response vehicles.
	.2	Provide temporary fire routes and signage as required to suit project phasing. Work with Owner to develop temporary fire exit routes.
<u>1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY</u>	.1	Protect surrounding private and public property from damage during performance of Work.
	.2	Document adjacent properties with digital photography and advise residents of any works likely to disturb adjacent properties.
	.3	Be responsible for damage incurred.
<u>1.10 PROTECTION OF BUILDING FINISHES</u>	.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.
<u>1.11 WASTE MANAGEMENT AND DISPOSAL</u>	.1	Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

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 RELATED REQUIREMENTS

- .1 Section - All Sections.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
.1 CCDC 2-2008, Stipulated Price Contract.
- .2 Within text of each specifications section, reference may be made to reference standards.
- .3 Conform to the latest issue of reference standards, in whole or in part as specifically requested in specifications.
- .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 borne by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 QUALITY

- .1 Products, materials, equipment and articles 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.
- .2 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.
- .3 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.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, 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.

1.5 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 and masonry 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 of 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.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Unload, handle and store such products.

1.7 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.

1.8 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.

1.9 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.

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|----------------------------------|----|--|
| <u>1.10 CONCEALMENT</u> | .1 | In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise. |
| | .2 | Before installation, inform Consultant if there is interference. Install as directed by Consultant. |
| | | |
| <u>1.11 REMEDIAL WORK</u> | .1 | Refer to CCDC 2 and Section 01 73 00 - Execution Requirements. |
| | .2 | 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. |
| | .3 | Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work. |
| | | |
| <u>1.12 LOCATION OF FIXTURES</u> | .1 | Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate. |
| | .2 | Inform Consultant of conflicting installation. Install as directed. |
| | | |
| <u>1.13 FASTENINGS</u> | .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. |

1.14 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.

1.15 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.

1.16 EXISTING
UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

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 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008 Stipulated Price Contract.
 - .2 Owner's identification of existing survey control points and property limits.
 - .3 Section 01 14 00 Work Restrictions
- 1.2 QUALIFICATIONS OF SURVEYOR**
- .1 Qualified registered land surveyor, licensed to practice in Place of Work. .
- 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 to 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.
 - .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 and to suit Municipal standards.
- 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 when required by Consultant.
- 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 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to the Contract Documents.

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 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 including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At perimeter of and 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.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.5 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

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 Canadian Construction Documents Committee (CCDC)
.1 CCDC 2-2008, Stipulated Price Contract.
- .2 CCDC/OAA Document 100/Latest Edition.

**1.2 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.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only remove from site.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site roll off containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 FINAL CLEANING

- .1 Refer to CCDC 2, GC 3.13.
- .2 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris including that caused by Owner or other Contractors.
- .6 Remove waste materials from site at regularly scheduled times.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8 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.
- .9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors .
- .10 Clean lighting reflectors, lenses, and other lighting surfaces.
- .11 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .12 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .13 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .14 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .15 Remove dirt and other disfiguration from exterior surfaces.
- .16 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .17 Sweep and wash clean paved areas.

- .18 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .19 Clean roofs, downspouts, and drainage systems.
- .20 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .21 Remove snow and ice from access to building.

1.4 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

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 WASTE
MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Owner and Consultant to review and discuss Waste Management Plan and Goals.
- .2 Waste Management Goal 75 percent of total Project Waste to be diverted from landfill sites. Provide Consultant documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.
- .3 Accomplish maximum control of solid construction waste.
- .4 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .3 Inert Fill: inert waste - exclusively asphalt and concrete.
- .4 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .5 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .6 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .7 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .8 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

- .2 Returning reusable items including pallets or unused products to vendors.
- .9 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .10 Separate Condition: refers to waste sorted into individual types.
- .11 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
- .12 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.
- .13 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .14 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.3 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
 - .1 Waste Audit.
 - .2 Waste Reduction Workplan.
 - .3 Material Source Separation Plan.
 - .4 Schedules A B E completed for project.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
 - .1 Submit 2 copies of completed Waste Audit (WA): Schedule A.
 - .2 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B.
 - .3 Submit 2 copies of Materials Source Separation Program (MSSP) description.
- .3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using

deconstruction/disassembly material audit form.

- .1 Failure to submit could result in hold back of final payment.
- .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.
- .3 For each material reused, sold or recycled from project, include amount in tonnes quantities by number, type and size of items and the destination.
- .4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.5 WASTE AUDIT
(WA)

- .1 Conduct WA prior to project start-up.
- .2 Prepare WA: Schedule A.
- .3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

1.6 WASTE REDUCTION
WORKPLAN (WRW)

- .1 Prepare WRW prior to project start-up.
- .2 WRW should include but not limited to:
 - .1 Destination of materials listed.
 - .2 Deconstruction/disassembly techniques and sequencing.
 - .3 Schedule for deconstruction/disassembly.
 - .4 Location.
 - .5 Security.
 - .6 Protection.
 - .7 Clear labelling of storage areas.
 - .8 Details on materials handling and removal procedures.
 - .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .4 Describe management of waste.
- .5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
- .6 Post WRW or summary where workers at site are able to review content.

- .7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
- .8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.7 MATERIALS
SOURCE SEPARATION
PROGRAM (MSSP)

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Consultant.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
 - .1 Transport to approved and authorized recycling facility to users of material for recycling.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.
 - .1 Ship materials to site operating under Certificate of Approval.
 - .2 Materials must be immediately separated into required categories for reuse or recycling.

1.8 WASTE
PROCESSING SITES

- .1 Contractor to provide a list of Province of Ontario approved waste processing sites where material from this project will be sent for reuse and recycling.

1.9 STORAGE,
HANDLING AND
PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Construction Manager.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.

- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

1.10 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste volatile materials mineral spirits oil paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.11 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.

1.12 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 APPLICATION .1 Do Work in compliance with WRW.
.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
.2 Clean-up work area as work progresses.
.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Construction Manager and consistent with applicable fire regulations.
.1 Mark containers or stockpile areas.
.2 Provide instruction on disposal practices.
.2 On-site sale of salvaged recovered reusable recyclable materials is not permitted.

.3 Construction Waste:

<u>Material Type</u>	<u>Recommended Diversion %</u>
Cardboard	100
Plastic Packaging	100
Rubble	100
Steel	100
Wood (uncontaminated)	100

3.4 WASTE AUDIT
(WA)

.1 Schedule A - Waste Audit (WA):

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
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.1 Wood
and Plastics

Material
Description

Off-cuts

Warped
Pallet

Forms

Plastic
Packaging

Cardboard
Packaging

Other

.2 Doors
and Windows

Material
Description

Painted
Frames

Glass

Wood

Metal

Other

3.5 WASTE REDUCTION .1 Schedule B:
WORKPLAN (WRW)

(1) Material Category	(2) Person(s) Responsible	(3) Total Quantity of Waste (Unit)	(4) Actual Reused Amount (units)	(5) Actual Recycle Amount (unit)	(6) Material(s) Designation
<u>.1 Wood and Plastics</u>					
Material Description					
Chutes					
Warped Pallet					
Forms					
Plastic Packaging					
Card-board Packaging					
Other					
<u>.2 Doors and Windows</u>					
Material Description					
Painted Frames					
Glass					
Wood					
Metal					
Other					

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008, Stipulated Price Contract.
- .2 OGCA/OAA Document 100 latest edition.
- .3 Section 01 74 11 – Cleaning.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: 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 Boiler Inspection Branch, Fire Commissioner, Utility companies: submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.
 - .6 Commissioning of mechanical systems: completed in accordance with Commissioning Requirements and 2 copies of final Commissioning Report submitted to Consultant.
- .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Consultant, and Contractor.
 - .2 When Work incomplete according to Owner and 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.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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 ADMINISTRATIVE
REQUIREMENTS**

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Consultant, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's installation instructions and warranty requirements.
 - .2 Consultant to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

**1.2 ACTION AND
INFORMATIONAL
SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Consultant, four final copies of operating and maintenance manuals in English.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

1.4 CONTENTS -
PROJECT RECORD
DOCUMENTS

- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide scanned drawing files in PDF format on CD.
- .1 Table of Contents for Each Volume: provide
 - .1 Title of project;
 - .2 Date of submission;
 - .3 Names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .4 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.
- .1 Maintain, in addition to requirements in General Conditions, at site for Consultant and Owner one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.

1.6 RECORDING
INFORMATION ON
PROJECT RECORD
DOCUMENTS

- .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
 - .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
 - .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
 - .1 Record information on set of black line opaque drawings.
 - .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
 - .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
 - .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
 - .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
 - .6 Other Documents: maintain manufacturer's certifications,

inspection certifications, field test records, required by individual specifications sections.

- .7 Provide digital photos, as requested, for site records. CD/DVD format.

1.7 FINAL SURVEY

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

1.8 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.

- .11 Provide Contractor's Design-Builder's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control and to suit commissioning requirements.
- .15 Additional requirements: as specified in individual specification sections.

1.9 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.10 MAINTENANCE MATERIALS

- .1 Spare Parts:
 - .1 Provide spare parts, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to site location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Consultant.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to site location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Consultant.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
- .1 Provide special tools, in quantities specified in individual specification section.
 - .2 Provide items with tags identifying their associated function and equipment.
 - .3 Deliver to site location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Consultant.
 - .2 Include approved listings in Maintenance Manual.
- 1.11 DELIVERY, STORAGE AND HANDLING
- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
 - .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
 - .3 Store components subject to damage from weather in weatherproof enclosures.
 - .4 Store paints and freezable materials in a heated and ventilated room.
 - .5 Remove and replace damaged products at own expense and for review by Consultant.
- 1.12 WARRANTY AND BONDS
- .1 Develop warranty management plan to contain information relevant to Warranties.
 - .2 Warranty management plan to include required actions and documents to assure that Owner receives warranties to which it is entitled.
 - .3 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with

name, address, and telephone number of responsible principal.

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

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

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

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

.5 Conduct joint 4 month warranty inspection, measured from time of acceptance, by Consultant.

.6 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, sprinkler systems, .

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected

for various warranted equipment.

.4 Contractor's plans for attendance at 4 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.7 Respond in timely manner to oral or written notification of required construction warranty repair work.

.8 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Consultant to proceed with action against Contractor.

1.13 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.

.2 Model number.

.3 Serial number.

.4 Contract number.

.5 Warranty period.

.6 Inspector's signature.

.7 Construction Contractor.

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 RELATED
SECTIONS

- .1 Instruction to Bidders and General Requirements.
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 77 00 – Close Out Procedures
- .4 Section 01 78 00 – Close Out Submittals
- .5 Section 01 91 13 - General Commissioning CX Requirements
- .6 Mechanical drawings
- .7 Electrical drawings

1.2 DESCRIPTION

- .1 The Owner will engage the services of an independent commissioning agent to work with the Contractor to co-ordinate and verify the Commissioning activities. Co-operate fully with the Owner's Commissioning Agent.
- .2 Appointment of Commissioning Agent does not in any way relieve the Contractor of any commissioning duties. The Commissioning Agent's role is quality control, performance verification and supervision of training delivery.
- .3 Demonstrate operation and maintenance of equipment and systems to Owner's Commissioning Agent and personnel two weeks prior to date of substantial performance.
- .4 Owner will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.3 QUALITY CONTROL

- .1 When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.4 SUBMITTALS

- .1 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, for Consultant'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.

1.5 CONDITIONS FOR
DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with Division 15 and 16.
- .2 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements and equipment and systems are fully operational.
- .3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.
- .4 Construction Manager reserves the right to video tape/ record demonstrations/ instructions.

1.6 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.7 DEMONSTRATION
AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the designated location.
- .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 need for additional data becomes apparent during instructions.

1.8 TIME ALLOCATED
FOR INSTRUCTIONS

- .1 Ensure amount of time required for instruction of each item of equipment or system as follows:
TRAINING REQUIREMENTS TO BE CONFIRMED BY THE MECHANICAL CONSULTANT.
 - .1 Cooling and Ventilation System: 8 hours of instruction.
 - .2 Control System: 8 hours of instruction.
 - .3 Plumbing System: 4 hours of instruction.
 - .4 Electrical System: 4 hours of instruction.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.
- .2 Related Sections:
 - .1 Section 01 77 00 - Closeout Procedures
 - .2 Section 01 78 00 - Closeout Submittals
 - .3 Section 01 79 00 - Demonstration and Training
 - .4 Mechanical drawings
 - .5 Electrical drawings
- .3 Acronyms:
 - .1 BMM - Building Management Manual.
 - .2 Cx - Commissioning.
 - .3 EMCS - Energy Monitoring and Control Systems.
 - .4 O&M - Operation and Maintenance.
 - .5 PI - Product Information.
 - .6 PV - Performance Verification.
 - .7 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

- .1 The Owner will engage the services of an independent commissioning agent to work with the Contractor to co-ordinate and verify the Commissioning activities co-operate fully with the Owner's Commissioning Agent.
- .2 Appointment of Commissioning Agent does not in any way relieve the Contractor of any commissioning duties. The Commissioning Agent's role is quality control, performance verification and supervision of training delivery.
- .3 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
 - .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
 - .2 Ensure appropriate documentation is compiled into the BMM.
 - .3 Effectively train O&M staff.
- .4 Contractor assists in Cx process, operating equipment and

systems, troubleshooting and making adjustments as required.

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.

.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.5 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.2 COMMISSIONING OVERVIEW

.1 Commissioning (Cx) Plan to be prepared by the Commissioning Agent of the Owner.

.2 For Cx responsibilities refer to Commissioning (Cx) Plan to be prepared by the Commissioning Agent of the Owner.

.3 Cx to be a line item of Contractor's cost breakdown.

.4 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.5 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facilities are constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.

.6 Commissioning Agent will issue Interim Acceptance Certificate when:

.1 Completed Cx documentation has been received, reviewed for suitability and approved by Consultant and Commissioning Agent.

.2 Equipment, components and systems have been commissioned.

.3 O&M training has been completed.

1.3 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as

deemed required by Consultant and Commissioning Agent, to ensure effective performance.

- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.4 PRE-CX REVIEW

- .1 Before Construction:
 - .1 Review contract documents, confirm by writing to Consultant and Commissioning Agent.
 - .1 Adequacy of provisions for Cx.
 - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
 - .1 Co-ordinate provision, location and installation of provisions for Cx.
- .3 Before start of Cx:
 - .1 Have completed Cx Plan up-to-date.
 - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
 - .3 Fully understand Cx requirements and procedures.
 - .4 Have Cx documentation shelf-ready.
 - .5 Understand completely design criteria and intent and special features.
 - .6 Submit complete start-up documentation to Consultant and Commissioning Agent.
 - .7 Have Cx schedules up-to-date.
 - .8 Ensure systems have been cleaned thoroughly.
 - .9 Complete TAB procedures on systems, submit TAB reports to Commissioning Agent for review and approval.
 - .10 Ensure "As-Built" system schematics are available.
- .4 Inform Consultant and Commissioning Agent in writing of discrepancies and deficiencies on finished works.

1.5 CONFLICTS

- .1 Report conflicts between requirements of this section and other sections to Consultant and Commissioning Agent before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.6 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal

Procedures.

- .1 Submit no later than 4 weeks after award of Contract:
 - .1 Name of Contractor's Cx representative.
 - .2 Draft Cx documentation.
 - .3 Preliminary Cx schedule.
- .2 Request in writing to Consultant and Commissioning Agent for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
- .3 Submit proposed Cx procedures to Commissioning Agent where not specified and obtain written approval at least 8 weeks prior to start of Cx.
- .4 Provide additional documentation relating to Cx process required by Commissioning Agent.

1.7 COMMISSIONING
DOCUMENTATION

- .1 Commissioning (Cx) Forms: (To be provided by the Commissioning Agent) Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use.
- .2 Commissioning Agent to review and approve Cx documentation.
- .3 Provide completed and approved Cx documentation to Commissioning Agent.

1.8 COMMISSIONING
SCHEDULE

- .1 Provide detailed Cx schedule as part of construction schedule.
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
 - .1 Approval of Cx reports.
 - .2 Verification of reported results.
 - .3 Repairs, retesting, re-commissioning, re-verification.
 - .4 Training.

1.9 COMMISSIONING
MEETINGS

- .1 Convene Cx meetings following project meetings.
- .2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.
- .4 At 60 % construction completion stage. Commissioning Agent to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:

- .1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
- .2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.

.5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Owner's Cx Agent, who will record and distribute minutes.

.7 Ensure subcontractors and relevant manufacturer representatives are present at 60 % and subsequent Cx meetings and as required.

1.10 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.11 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days notice prior to commencement.

.2 Commissioning Agent to witness of start-up and testing.

.3 Contractor's Cx Representative to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.12 MANUFACTURER'S INVOLVEMENT

- .1 Factory testing: manufacturer to:
 - .1 Coordinate time and location of testing.
 - .2 Provide testing documentation for approval by Commissioning Agent.
 - .3 Arrange for Commissioning Agent to witness tests.
 - .4 Obtain written approval of test results and documentation from Commissioning Agent before delivery to site.
- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Commissioning Agent
 - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
 - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-

up.

- .3 Integrity of warranties:
 - .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
 - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
 - .1 Experienced in design, installation and operation of equipment and systems.
 - .2 Ability to interpret test results accurately.
 - .3 To report results in clear, concise, logical manner.

1.13 PROCEDURES

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
 - .1 Included in delivery and installation:
 - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
 - .2 Visual inspection of quality of installation.
 - .2 Start-up: follow accepted start-up procedures.
 - .3 Operational testing: document equipment performance.
 - .4 System PV: include repetition of tests after correcting deficiencies.
 - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Consultant and Commissioning Agent after distinct phases have been completed and before commencing next phase.
- .4 Document require tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Commissioning Agent. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
 - .1 Minor equipment/systems: implement corrective measures approved by Consultant and Commissioning Agent.
 - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Consultant and Commissioning Agent.

- .3 If evaluation report concludes that major damage has occurred, Consultant and Commissioning Agent shall reject equipment.
 - .1 Rejected equipment to be remove from site and replace with new.
 - .2 Subject new equipment/systems to specified start-up procedures.

1.14 START-UP
DOCUMENTATION

- .1 Assemble start-up documentation and submit to Commissioning Agent for approval before commencement of commissioning.
- .2 Start-up documentation to include:
 - .1 Factory and on-site test certificates for specified equipment.
 - .2 Pre-start-up inspection reports.
 - .3 Signed installation/start-up check lists.
 - .4 Start-up reports,
 - .5 Step-by-step description of complete start-up procedures, to permit Commissioning Agent to repeat start-up at any time.

1.15 OPERATION AND
MAINTENANCE OF
EQUIPMENT AND
SYSTEMS

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit Commissioning Agent for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.16 TEST RESULTS

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

1.17 START OF
COMMISSIONING

- .1 Notify Consultant and Commissioning Agent at least 21 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and

performance verification of systems have been completed.

1.18 INSTRUMENTS /
EQUIPMENT

- .1 Submit to Commissioning Agent for review and approval:
 - .1 Complete list of instruments proposed to be used.
 - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .2 Provide the following equipment as required:
 - .1 2-way radios.
 - .2 Ladders.
 - .3 Equipment as required to complete work.

1.19 COMMISSIONING
PERFORMANCE
VERIFICATION

- .1 Carry out Cx:
 - .1 Under actual or accepted simulated operating conditions, over entire operating range, in all modes.
 - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

1.20 WITNESSING
COMMISSIONING

- .1 Commissioning Agent to witness activities and verify results.

1.21 AUTHORITIES
HAVING JURISDICTION

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Consultant and Commissioning Agent within 5 days of test and with Cx report.

1.22 EXTRAPOLATION
OF RESULTS

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to

design conditions when approved by Consultant and Commissioning Agent in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.23 EXTENT OF VERIFICATION

- .1 Elsewhere:
 - .1 Provide manpower and instrumentation to verify up to 30 % of reported results, unless specified otherwise in other sections.
 - .2 Number and location to be at discretion of Consultant and Commissioning Agent.
 - .3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.
 - .4 Review and repeat commissioning of systems if inconsistencies found in more than 20 % of reported results.
 - .5 Perform additional commissioning until results are acceptable to Consultant and Commissioning Agent.

1.24 REPEAT VERIFICATIONS

- .1 Assume costs incurred by Consultant and Commissioning Agent for third and subsequent verifications where:
 - .1 Verification of reported results fail to receive Consultant's and Commissioning Agent approval.
 - .2 Repetition of second verification again fails to receive approval.
 - .3 Consultant and Commissioning Agent deems Contractor's request for second verification was premature.

1.25 SUNDRY CHECKS AND ADJUSTMENTS

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

1.26 DEFICIENCIES, FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Consultant and Commissioning Agent.
- .2 Report problems, faults or defects affecting Cx to Consultant and Commissioning Agent in writing. Stop Cx until problems are rectified. Proceed with written approval from Consultant and Commissioning Agent.

1.27 COMPLETION OF
COMMISSIONING

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Commissioning Agent.

1.28 ACTIVITIES
UPON COMPLETION OF
COMMISSIONING

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.29 TRAINING

- .1 In accordance with Section 01 79 00 – Demonstration and Training.

1.30 MAINTENANCE
MATERIALS, SPARE
PARTS, SPECIAL
TOOLS

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.31 OCCUPANCY

- .1 Cooperate fully with General Contractor, Consultant and Commissioning Agent during stages of acceptance and occupancy of facility.

1.32 INSTALLED
INSTRUMENTATION

- .1 Use instruments installed under Contract for TAB and PV if:
 - .1 Accuracy complies with these specifications.
 - .2 Calibration certificates have been deposited with Commissioning Agent.
- .2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.33 PERFORMANCE
VERIFICATION
TOLERANCES

- .1 Application tolerances:
 - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10 % of specified values.
- .2 Instrument accuracy tolerances:

.1 To be of higher order of magnitude than equipment or system being tested.

.3 Measurement tolerances during verification:
.1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

1.34 OWNER'S PERFORMANCE TESTING

.1 Performance testing of equipment or system by Commissioning Agent will not relieve Contractor from compliance with specified start-up and testing procedures.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 00 – Common Work Results for Masonry
- .2 Section 04 05 23 – Masonry Accessories
- .3 Section 07 84 00 – Firestopping
- .4 Section 07 21 29 – Spray-in-Place Foam Insulation
- .5 Section 07 27 00 – Air Barriers
- .6 Section 07 92 00 – Sealants
- .7 Division 26 - Electrical

1.2 REFERENCES

- .1 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .3 CSA A23.4-09, Precast Concrete-Materials and Construction.
 - .4 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .5 CSA G30.18-09, Carbon and Steel Bars for Concrete Reinforcement.
 - .6 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .7 CSA W48-06(R2011), Filler Metals and Allied Materials for Metal Arc Welding.
 - .8 CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding).
 - .9 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .2 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .3 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #18 Primer, Zinc Rich Organic.
 - .2 MPI #79 Primer, Alkyd, Anti-Corrosive for Metal.

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 concrete mixes 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, Canada.
 - .2 Submit shop drawings to CSA A23.4 and CAN/CSA-A23.3.
 - .3 Submit 2 copies of detailed calculations and design drawings for typical precast elements and connections for Consultant for review a minimum of 4 weeks prior to manufacture.
 - .4 Indicate on drawings:
 - .1 Design calculations for items designated by manufacturer.
 - .2 Tables and bending diagrams of reinforcing steel.
 - .3 Camber.
 - .4 Finishing schedules.
 - .5 Methods of handling and erection.
 - .6 Openings, sleeves, inserts and related reinforcement. Including embedded handling hardware.
 - .7 Methods of anchoring and connections.
 - .8 Indicate of Building elevation drawings, location if all joints in precast elements.
- .4 Samples:
 - .1 Produce, deliver and erect where directed by Consultant on project site, 1 full size sample of precast concrete units showing details, colour, finish and quality for review of Consultant.
 - .1 Begin production of precast units after receipt of Consultant "reviewed" comments.
 - .2 Resubmit samples if rejected by Consultant, which address Consultant comments.
- .5 Submit evidence of welding certification including welding procedures before commencing work.
- .6 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage targets.
 - .2 Erosion and Sedimentation Control: submit copy of

erosion and sedimentation control plan in accordance with authorities having jurisdiction

- .3 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products,
 - .2 Submit evidence, when Supplementary Cementing Materials (SCMs) are used, to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.
- .4 Low-Emitting Materials:
 - .1 Submit listing of coatings and sealers used in building, showing compliance with VOC and chemical component limits or restriction requirements.

1.4 QUALITY ASSURANCE

- .1 Fabricate and erect precast concrete elements using manufacturing plant certified by CSA International in appropriate categories to CSA A23.4.
- .2 Precast concrete manufacturer to be certified to CSA's certification procedures for precast concrete plants prior to submitting bid and to specifically verify as part of bid that plant is currently certified in appropriate category - Architectural
- .3 Only precast elements fabricated in such certified plants to be acceptable to owner, and plant certification to be maintained for duration of fabrication, erection until warranty expires.
- .4 Welder Qualification: certified to CSA W47.1 and for weld type required.
- .5 Submit evidence of welding certification including welding procedures before commencing 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 or indoors, in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect precast panels from damage.
 - .3 Replace defective or damaged materials with new.

- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan and Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
 - .1 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
 - .2 Separate for recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan.
 - .3 Divert unused concrete materials from landfill to local facility.
 - .4 Fold up metal banding, flatten and place in designated area for recycling.

1.6 POST INSTALLATION CERTIFICATION

- .1 After installation provide written certification, bearing stamp of the Engineer responsible for the design indicated on the shop drawings, that all items have been installed in accordance with stamped shop drawings.

1.7 WARRANTY

- .1 Contractor hereby warrants that precast architectural elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with CCDC 2 General Conditions GC 12.3, but for 5 years.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Cement, aggregates, water, admixtures: to CSA A23.4 and CSA A23.1/A23.2.
- .2 Use same brands and source of cement and aggregate for entire project to ensure uniformity of colouration and other mix characteristics.
- .3 Reinforcing steel: epoxy coated.
- .4 Prestressing steel: to CAN/CSA-S6 and CSA G279.
- .5 Welded wire fabric: epoxy coated.
- .6 Forms: to CSA A23.4.

- .7 Hardware and miscellaneous materials: to CSA A23.1/A23.2.
- .8 Anchors and supports: to CSA G40.20/G40.21, Type 300 W, epoxy coated after fabrication.
- .9 Welding materials: to CSA W48.
- .10 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m² to ASTM A 123/A 123M.
- .11 Epoxy coating: to ASTM A 775/A 775M.
- .12 Air entrainment admixtures: to manufacturers standards.
- .13 Chemical admixtures: to manufacturers standards.
- .14 Bearing pads: neoprene, 60 durometer hardness to ASTM D 2240, and 17 MPa minimum tensile strength to ASTM D412, moulded to size or cut from moulded sheet.
- .15 Shims: plastic
- .16 Zinc-rich primer: to MPI #18.
- .17 Weep hole tubes: purpose made plastic.
- .18 Curing compound: not permitted without prior approval of Consultant.
- .19 Sealers:
 - .1 Shop applied: methyl methacrylate
- .20 Sealant:
 - .1 As per Section 07 92 00 Sealants

2.2 CONCRETE MIXTURES

- .1 Proportion normal density concrete in accordance with CSA A23.1/A23.2 Alternative 1 to give following properties: for all concrete.
 - .1 Cement: use Type 30 Portland cement to CSA A3001.
 - .2 Minimum compressive strength at 28 days: 35 MPa.
 - .3 Minimum cement content:
 - .1 325kg/m³ of concrete (for 20mm aggregate)
 - .2 355kg/m³ of concrete (for 14mm aggregate)
 - .4 Class of exposure: C1.
 - .5 Nominal size of coarse aggregate: 20mm max.
 - .6 Water cement ratio: 0.40 max.
 - .7 Air content: 4 to 7%.
 - .8 Chemical admixtures:

- .1 Air Entrainment – Micro Air by BASF Chemicals.
- .2 High Range water reducer (HRWR) Glenium 7700 by BASF Chemicals.
- .9 Air-dry density: 2160 kg/m³. Max for lightweight concrete.
- .10 Slump at time and point of discharge: 75mm.
- .11 Use of calcium chloride or products containing calcium chloride note permitted.
- .12 Colouring agent: not more than 10% of cement weight.

2.3 GROUT MIXES

- .1 Cement grout: composition of non-metallic aggregate and Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing specified compressive strength.
- .2 Minimum compressive strength: 30MPa at 28 days.
- .3 Shrinkage compensating grout: to Section 03 30 00 - Cast-in-Place Concrete.

2.4 DESIGN REQUIREMENTS

- .1 Design precast elements to CAN/CSA-A23.3, CSA A23.4 and to resist handling, stockpiling, shipping and erection stresses.
- .2 Design precast elements to carry loads as indicated, and in accordance with NBCC and applicable codes.
 - .1 Design to include resistance to creep, shrinkage and temperature effects, and, wind and earthquake loads.
- .3 Design connections and attachments of precast elements to load and forces as indicated, and in accordance with NBCC and applicable codes.
 - .1 Connections to be designed to withstand long-term corrosion for exposed elements.
 - .2 Design precast elements and connections of precast concrete cap units to meet or exceed the lateral design load requirements for guardrails as required under the Ontario Building Code.
- .4 Provide corner returns at all exposed corners.

2.5 PERFORMANCE REQUIREMENTS

- .1 Tolerance of precast elements: to CSA A23.4.

2.6 FABRICATION

- .1 Manufacture units to CSA A23.4.
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit which will not be exposed.
- .3 Design and attach anchors and inserts to precast concrete elements to carry design loads.
- .4 Shop prime anchors and steel inserts after fabrication and touch up primer on anchors after welding. Do not apply primer to embedded portion of anchors or inserts.
- .5 Galvanize anchors and steel embedments after fabrication and touch up with zinc-rich primer after welding.

2.7 FINISHES

- .1 Finish and colour of precast units to match existing precast units on site..
- .2 Sandblasted finish: in order to expose aggregate face to depth of 1.5mm, sandblast surface to conform with approved sample.
- .8 Protect exposed surfaces with 2 coats of sealer
 - .1 Sealers: in accordance with manufacturer's recommendations for surface conditions:
 - .2 Sealers: VOC limit 100 g/L maximum to SCAQMD Rule 1113.

2.8 SOURCE QUALITY CONTROL

- .1 Upon request provide Consultant with certified copies of quality control tests related to this project as specified in CSA A23.4.
- .2 Upon request provide records from in-house quality control programme based upon plant certification requirements to Consultant.
- .4 Upon request provide Consultant with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.
- .5 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Consultant for review upon request.

PART 3 - EXECUTION

- 3.1 GENERAL** .1 Do precast concrete work to CSA A23.4 and CAN/CSA-A23.3.
- 3.2 EXAMINATION** .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for precast concrete installation in accordance with manufacturer's written instructions.
.1 Inform Consultant of unacceptable conditions immediately upon discovery.
.2 Proceed with installation only after unacceptable conditions have been remedied.
- 3.3 ERECTION** .1 Erect precast elements within allowable tolerances as indicated.
.2 Non-cumulative erection tolerances in accordance with CSA A23.4.
.3 Set elevations and alignment between units to within allowable tolerances before connecting units.
.4 Bed parapet cap units in mortar in accordance with Section 04 05 12 - Masonry Mortar and Grout. Rake out joints 10 mm to receive sealant.
.5 Grout underside of unit bearing plates with shrinkage compensating grout.
.6 Fasten precast panels in place as indicated on reviewed shop drawings.
.7 Secure bolts with lockwashers or tack-weld nut to bolt.
.8 Uniformly tighten bolted connections with torque indicated on shop drawings.
.9 Do not weld or secure bearing plates at sliding joints.
.10 Set units dry, without mortar, attaining specified joint dimension with plastic shims.
.11 Clean field welds with wire brush and touch-up galvanized finish with zinc-rich primer.
.12 Remove shims and spacers from joints of non-load bearing panels after fastening but before sealant is applied.

- .13 Apply sealant to precast panels to manufacturer's recommendations unless specified otherwise.

3.4 WELDING

- .1 Weld to CSA W59 for welding to steel structures and to CSA W186 for welding of reinforcement.

3.5 CLEANING

- .1 Obtain approval of cleaning methods from Consultant before cleaning soiled precast concrete surfaces.
- .2 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

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

3.7 SCHEDULE

- .1 The work of this section shall include but not be limited to the manufacturing, supply and installation of precast architecture concrete elements as indicated on the drawings including all required steel connectors and anchors back to miscellaneous metal suspended framing (by others), masonry parapet walls, or concrete structure.

End of Section

PART 1 - GENERAL

- 1.1 RELATED SECTIONS**
- .1 Section 04 05 12 – Mortar and Masonry Grout.
 - .2 Section 04 05 19 – Masonry Anchorage and Reinforcing.
 - .3 Section 04 05 23 – Masonry Accessories.
 - .4 Section 04 21 13 – Brick Masonry.
 - .5 Section 05 50 00 – Metal Fabrications.
 - .6 Section 07 21 13 – Board Insulation
 - .7 Section 07 27 00 – Air Barriers.
 - .8 Section 07 92 00 – Joint Sealing.
- 1.2 REFERENCES**
- .1 Canadian Standards Association (CSA International).
 - .1 CSA-A165 Series-04, Standards on Concrete Masonry Units.
 - .2 CSA A179-04, Mortar and Grout for Unit Masonry.
 - .3 CSA-A371-04, Masonry Construction for Buildings.
- 1.3 ADMINISTRATIVE REQUIREMENTS**
- .1 Pre-installation meetings: comply with Section 01 31 19 - Project Meetings. Conduct pre-installation meeting two weeks prior to commencing work of this Section and on-site installations to:
 - .1 Verify project requirements, including mock-up requirements.
 - .2 Verify substrate conditions.
 - .3 Co-ordinate products, installation methods and techniques.
 - .4 Sequence work of related sections.
 - .5 Co-ordinate with other building subtrades.
 - .6 Review manufacturer's installation instructions.
 - .7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
 - .8 Review warranty requirements.
 - .2 Sequencing: sequence with other work in accordance with Section 01 32 16.06 - Construction Progress Schedule. Comply with manufacturer's written recommendations for sequencing construction operations.
 - .3 Scheduling: schedule with other work in accordance with Section 01 32 16.06 - Construction Progress Schedule.
- 1.3 ACTION**
- .1 Product Data.

SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples.
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit samples.
 - .1 Two of each type of masonry unit specified.
 - .2 Two of each type of masonry accessory specified.
 - .3 Two of each type of masonry reinforcement, tie and connector proposed for use.
- .3 Manufacturer's Instructions.
 - .1 Submit manufacturer's installation instructions.
 - .2 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, limitations and colours.
 - .3 Provide two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .4 Shop Drawings:
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Provide shop drawings detailing masonry anchoring and tie layout, and temporary bracing required, designed to resist wind pressure and lateral forces during installation.
- .5 Manufacturer's Reports: provide written reports prepared by Masonry veneer manufacturer's personnel to include:
 - .1 Verification of compliance of work with Contract.
 - .2 Site visit reports providing detailed review of installation of work, and installed work.

1.4 QUALITY ASSURANCE

- .1 Test Reports.
 - .1 Certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Submit laboratory test reports in accordance Section 01 29 83 - Payment Procedures: Testing Laboratory Services.
 - .3 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
- .2 Certificates: product certificates signed by manufacturer

certifying materials comply with specified performance characteristics and criteria and physical requirements.

- .3 Qualifications:
 - .1 Manufacturer: capable of providing field service representation during construction and approving application method.
 - .2 Installer: experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 - .3 Masons: company or person specializing in masonry installations with 5 years documented experience with masonry work similar to this project.
 - .1 Masons employed on this project must demonstrate ability to reproduce mock-up standards.
- .4 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control
 - .2 Construct mock-up panel of exterior masonry wall construction showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar and workmanship.
 - .3 Mock-up used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
 - .4 Construct mock-up where directed by Consultant.
 - .5 Allow 48 hours for inspection of mock-up by Consultant before proceeding with work.
 - .6 When accepted by Consultant, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
 - .7 Start work only upon receipt of written acceptance of mock-up by Consultant.

1.5 DELIVERY,
STORAGE, AND
HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to job site in dry condition, store and handle material in accordance with manufacturer's instructions.
- .3 Storage and Handling Protection.
 - .1 Keep materials dry until use except where wetting of bricks is specified.
 - .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, pallets, packaging material for recycling in accordance with Waste Management Plan.
- .3 Unused metal materials are to be diverted from landfill to a metal recycling facility as approved by Consultant.
- .4 Unused or damaged masonry materials must be diverted from landfill to a local facility as approved by Consultant.

1.7 SITE CONDITIONS

- .1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.
- .2 Weather Requirements: to CSA-A371.
- .3 Cold weather requirements.
 - .1 Supplement Clause 5.15.2 of CSA-A371 with following requirements.
 - .1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.
 - .2 Maintain ambient temperature between 5 degrees C and 50 degrees C and protect site from windchill.
- .4 Hot weather requirements.
 - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
 - .2 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.
- .5 Spray mortar surface at intervals and keep moist for maximum of three days after installations.

1.8 CLOSEOUT
SUBMITTALS

- .1 Provide manufacturer's instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into

manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Masonry materials are specified in Related Sections.

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 EXAMINATION .1 Examine conditions, substrates and work to receive work of this Section.
.1 Co-ordinate with Section 01 71 00 - Examination and Preparation.
.2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.
.1 Inform Consultant of unacceptable conditions immediately upon discovery.
.2 Proceed with installation after unacceptable conditions have been remedied.
.3 Verification of Conditions:
.1 Verify that:
.1 Substrate conditions which have been previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to installation of brick, concrete block, and dimensioned stone.
.2 Field conditions are acceptable and are ready to receive work.
.3 Built-in items are in proper location, and ready for roughing into masonry work.
.2 Commencing installation means acceptance of existing substrates.

3.3 PREPARATION

- .1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations and co-ordinate with Section 01 71 00 - Examination and Preparation.
- .2 Establish and protect lines, levels, and coursing.
- .3 Protect adjacent materials from damage and disfiguration.
- .4 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

3.4 INSTALLATION

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CSA-A371.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- .4 Assume complete responsibility for dimensions, plumbs and levels of this work and constantly check same with graduated rod.
- .5 Carry up walls in uniform manner. Raise no one portion more than 1.2m or less to avoid excessive loads on un-set joints. Ensure no impact to plumbness and alignment of wall as work progresses. Review permitted height with masonry veneer manufacturer and adjust as necessary to suit cure rate for each type of masonry unit.

3.5 CONSTRUCTION

- .1 Exposed masonry.
 - .1 Remove chipped, cracked, and otherwise damaged units, in accordance with CSA A-165, in exposed masonry and replace with undamaged units.
- .2 Jointing.
 - .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated. Typical for all exposed locations.
 - .2 Strike flush 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 Cutting.
 - .1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.
 - .2 Make cuts straight, clean, and free from uneven edges.
- .4 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.
- .5 Support of loads.
 - .1 Use 21 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 where grout is used in lieu of solid units.
 - .3 Install building paper below voids to be filled with concrete grout; keep paper 25 mm back from faces of units.
- .6 Provision for movement.
 - .1 Leave 20 mm space below shelf angles.
 - .2 Leave 15 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
 - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .7 Loose steel lintels.
 - .1 Install loose steel lintels. Centre over opening width.
- .8 Control joints.
 - .1 Construct continuous control joints as required for site condition, as indicated, and at maximum spacing of 9M.
- .9 Expansion joints.
 - .1 Build-in continuous expansion joints as indicated

3.6 SITE TOLERANCES

- .1 Tolerances in notes to CSA-A371 apply.

3.7 FIELD QUALITY CONTROL

- .1 Inspection and testing will be carried out by Testing Laboratory designated by Consultant.

.2 Manufacturer's Services:

- .1 Have manufacturer of masonry veneer products supplied under this Section review work involved in handling, installation/application, and protection of its products, 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 Schedule site visits to review work at stages listed:
 - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of work at 25% and 60% complete.
 - .3 Upon completion of work, after cleaning is carried out.
- .4 Obtain reports within three days of review and submit immediately to Consultant.

3.8 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Progress cleaning in accordance with related masonry sections.
- .3 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.9 PROTECTION

- .1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .2 Keep masonry dry using waterproof non-staining coverings. Drape over walls and extend down sufficient to protect walls from wind driven rain until masonry wall is complete and protected by flashings or other permanent construction.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED SECTIONS**
- .1 Section 04 05 00 – Common Work Results for Masonry.
 - .2 Section 04 05 19 – Masonry Anchorage and Reinforcing.
 - .3 Section 04 05 23 – Masonry Accessories.
 - .4 Section 04 21 13 – Brick Masonry..
- 1.2 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.
 - .3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- 1.3 ACTION SUBMITTALS**
- .1 Product Data.
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures and in Section 01 35 29.06 - Health and Safety Requirements. Indicate VOC's mortar, grout, parging, colour additives and admixtures. Expressed as grams per litre (g/L).
 - .2 Samples.
 - .1 Sample to be part of mock-up review.
 - .3 Manufacturer's Instructions.
 - .1 Submit manufacturer's installation instructions.
- 1.4 QUALITY ASSURANCE**
- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties and in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Submit laboratory test reports in accordance with Section 01 29 83 - Payment Procedures: Testing Laboratory

Services.

- .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:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry.

1.5 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.

1.6 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

1.5 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: CSA A179.
- .3 Aggregate: supplied by one supplier.
 - .1 to CAN/CSA A179,
 - .2 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
- .4 Cement:
 - .1 Portland Cement: to CAN/CSA-A3000, HS - High-sulphate-resistant hydraulic cement (Type 50), gray colour.
 - .2 Masonry Cement: to CAN/CSA-A3002 and CAN/CSA A179, Type N and S.
 - .3 Mortar Cement: to CAN/CSA-A3002 and CAN/CSA A179, Type N and S.
 - .4 Packaged Dry Combined Materials for mortar: to CAN/CSA A179, Type N and S, using gray colour cement.
- .5 Water: clean and potable.
- .6 Lime:
 - .1 Quick Lime: to CAN/CSA A179, Type N.
 - .2 Hydrated Lime: to CAN/CSA A179, Type S.
- .7 Bonding Agent: epoxy type.
- .8 Polymer Latex: organic polymer latex admixture of butadiene-styrene type non-emulsifiable bonding admixture.
- .9 Coloured Mortar: use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match specified brick to Consultant's approval. Use coloured mortar to match brick colour of "BM-1".
- .10 Non-Staining mortar: use non-staining masonry cement for cementitious portion of specified mortar type.
- .11 Grout: to CSA A179, Table 3.

2.2 MORTAR MIXES

- .1 Mortar for exterior masonry above grade:
 - .1 Loadbearing: type S based on proportion specifications.
 - .2 Non-Loadbearing: N 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
- .4 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: type M based on proportion specifications.
- .5 Following applies regardless of mortar types and uses specified above:
 - .1 Mortar for grouted reinforced masonry: type S based on proportion specifications.

2.3 MORTAR MIXING

- .1 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.
- .2 Maintain sand uniformly damp immediately before mixing process.
- .3 Add admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.
- .4 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.
- .5 Do not add air entraining admixture to mortar mix.
- .6 Use a batch type mixer in accordance with CAN/CSA A179.
- .7 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
- .8 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

2.4 GROUT MIXES

- .1 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.
 - .3 Inspection and testing will be carried out by Testing Laboratory designated by Consultant.

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 CSA A179 except where specified otherwise.
- 3.5 MIXING .1 Clean all mixing boards and mechanical mixing machine between batches.
- .3 Mortar must be weaker than the units it is binding.
- .4 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 requirements of CAN/CSA A179.
- .2 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 400mm, without consolidating grout by rodding.
- .5 Do not displace reinforcement while placing grout.
- 3.8 FIELD QUALITY CONTROL .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
- .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.
- .2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .3 Inspection and testing will be carried out by Testing Laboratory

(Issued for Tender)
designated by Owner.

3.3 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.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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
SECTIONS**

- .1 Section 04 05 12 – Mortar and Masonry Grout.
- .2 Section 04 05 23 – Masonry Accessories.
- .3 Section 04 21 13 – Brick Masonry.
- .4 Section 05 50 00 – Metal Fabrications.
- .5 Section 07 21 13 – Board Insulation
- .6 Section 07 27 00 – Air Barriers.

1.2 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 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 Submit manufacturer's printed product literature, specifications and datasheets illustrating products to be incorporated into project for specified products.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for epoxy coatings and galvanized protective coatings and touch-up products.
- .2 Shop Drawings :
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .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 connectors.
- .3 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

-
- .4 Samples:
.1 Samples to be part of mock-up sample for review.
- 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. Comply with Section 04 05 00 - Common Work Results for Masonry.
- .4 Mock-ups:
.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
.1 Construct mock-ups panel of anchorage installation and reinforcement installation.
.2 Sample panel: using proposed procedures, anchorage material, connectors, reinforcement material, and workmanship.
- 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, supplemented as follows:
.1 Deliver reinforcement and connectors, identified in shop and placement drawings.
- 1.7 WASTE MANAGEMENT AND DISPOSAL
- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.

- .3 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Bar reinforcement: to CSA-A371 and CAN/CSA G30.18, Grade 400.
- .2 Wire reinforcement: to CSA-A371 and CSA G30.14, truss type, tri-rod for cavity walls, with min. 3.8 mm deformed side rods but heavier rods where required, galvanized without a drip, 50 mm narrower than wall.
- .3 Connectors: to CSA-A370 and CSA-S304.
- .4 Corrosion protection: to CSA-S304.1, galvanized to CSA-S304.1 and CSA-A370. Hot dip galvanized with min. 0.46 kg. zinc /m2.
- .5 At back up metal studs, use Bailey brick tie/connector or Fero Slotted Stud Tie with brick connector connected by sheet metal screws to web of stud; all material to be hot dipped galvanized complete with insulation support clip.
- .6 Fasteners to steel studs: sheet metal screws with self-drilling tip round of pan head, min. 10mm longer than material to be fastened min. 4.8mm diameter (#12). Construction Fasteners Inc.'s "Sentri-Coating, Buildex" Climaseal Coating", or 300 Series Stainless Steel. Engineer for large format masonry units.
- .7 At back up wood studs, use Fero Slotted RAP tie or Holed PAP ties fastened to the face of the structural sheathing panels at stud locations.
- .7 Back up concrete or concrete block walls: use Helifix stainless steel masonry ties (6mm) by Blok-Lok Ltd. Anchors to be drilled into place and not set into mortar joints. Ties to be drilled through cavity wall insulation and air/vapour barrier. Use Wedge-Lok fasteners by by Block-Lok to hold wall insulation in place or Fero Slotted Block Tie Type 1 for concrete block walls and Fero Slotted Rap Tie for poured concrete walls. Ties to be hot dipped galvanized complete with insulation support clip. Engineer for large format masonry units.

<u>2.2 FABRICATION</u>	.1	Fabricate reinforcing in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.
	.2	Fabricate connectors in accordance with CSA-A370.
	.3	Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
	.4	Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
	.5	Ship reinforcement and connectors, clearly identified in accordance with drawings.
<u>2.3 SOURCE QUALITY CONTROL</u>	.1	Upon request, provide Consultant with certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis, minimum 5 weeks prior to commencing reinforcement work.
	.2	Upon request inform Consultant of proposed source of material to be supplied.
<u>PART 3 - EXECUTION</u>		
<u>3.1 MANUFACTURER'S INSTRUCTIONS</u>	.1	Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
<u>3.2 INSTALLATIONS</u>	.1	Supply and install masonry connectors and reinforcement in accordance with CSA-A370, CSA-A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
	.2	As part of mock-up assembly, obtain Consultant's review of placement of reinforcement and connectors.
	.3	Supply and install additional reinforcement to masonry as indicated.
<u>3.3 HORIZONTAL REINFORCING</u>	.1	Provide horizontal reinforcing in all masonry work in accordance with drawings. Refer to structural drawings.
	.2	Install continuous horizontal reinforcing in each wythe of every concrete block wall at vertical spacing intervals 400mm

maximum or 200mm where called for. Lap 150mm at each splice.

- .3 Utilize "L" and "T" shaped horizontal reinforcement at corners and abutting partitions.
- .4 Additionally place reinforcement in the first and second bed joints above and below openings extending 600mm beyond each side of opening.
- .5 Place joint reinforcement continuous in first [and second] joint below top of walls.
- .6 Lap joint reinforcement ends minimum 150 mm.
- .7 Reinforce masonry where thickness is reduced by a column or chase with a length of horizontal reinforcing in the joint of every block course and extending 1.2m beyond each end of the column or chase.

3.4 BONDING AND TYING

- .1 Bond walls of two or more wythes using metal connectors in accordance with CSA-S304, CSA-A371 and as indicated and specified.
- .2 Tie masonry veneer to backing in accordance with NBC, CSA-S304.1, CAN/CSA A371 and as indicated.
- .3 Install unit, adjustable, single wythe and multiple wythe joint reinforcement where indicated and in accordance with CAN/CSA A370 and CAN/CSA A371 and manufacturer's instructions.
 - 1 Locate box anchors in cavity walls at max. 400mm o.c. vertically and maximum 600mm o.c. horizontally.
 - .2 Secure special ties to framing: locate at maximum 400mm o.c. horizontally and max. 600mm o.c. vertically to metal studs.
 - .3 Additionally reinforce brick to steel/wood stud framing:
 - .1 At max. 3 brick courses below top of any wall or wall opening.
 - .2 At max. 5 brick courses above steel lintels and shelf angles.
- .4 Connect stack bonded unit joint corners and intersections with strap anchors 400 mm on centre

3.5 EARTHQUAKE

- .1 Reinforce masonry elements in accordance with most recent issue of Ontario Building code and National Building Code.

- .2 Reinforce masonry elements in accordance with CSA-A371, and as indicated, supplemented as follows:
 - .1 Loadbearing and lateral load-resisting masonry and
 - .2 Masonry enclosing elevator shafts and stairways or used as exterior cladding, and
 - .3 Masonry partitions exceeding 200 kg/m² or 3m in height.
- .3 Set dowels in foundations and floor slabs at cores of block to be reinforced.
- .4 Install vertical rod reinforcing in cores, sized and spaced as shown on drawings.
- .5 Anchor reinforcing to floor of foundation and to structure above.
- .6 Anchor masonry to structural beams, columns, and walls at maximum 400mm o.c. vertically and max. 12.m. o.c. horizontally.
- .7 Lap reinforcing bars min. 36 bar diameters at splices.
- .8 Embed bolts and anchors solidly in mortar or grout to develop maximum resistance to design forces.
- .9 Tie intersecting new bearing walls together with reinforcing in every second course.
- .10 Provide lateral support and anchorage in accordance with CSA-A371 and as indicated and specified.
- .11 Consult drawings for additional reinforcing.

3.6 REINFORCED
LINTELS AND BOND
BEAMS

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

3.7 GROUTING

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

3.8 ANCHORS

- .1 Supply and install metal anchors as indicated.

- .2 Embed metal anchors solidly in mortar or grout to develop maximum resistance to design forces.
 - .3 Anchor masonry to structural beams, columns, and walls max. 400mm o.c. vertically and max. 1.2m o.c. horizontally.
 - .1 Anchor concrete block steel columns and beams with 250mm long x 38mm wide x 3mm thick "L" shaped straps at 400mm o.c. with 200mm leg in block and 50mm leg welded to column or beam.
 - .2 Anchor new concrete block to existing concrete block with corrugated ties at 400mm o.c.
- 3.9 LATERAL SUPPORT AND ANCHORAGE
- .1 Supply and install lateral support and anchorage in accordance with CSA-S304.1 and as indicated.
- 3.10 MOVEMENT JOINTS
- .1 Reinforcement will not be continuous across movement joints unless otherwise indicated.
 - .2 Stop reinforcing 25mm on each side of control joints unless otherwise indicated.
- 3.11 FIELD BENDING
- .1 Do not field bend reinforcement and connectors except where indicated or 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.
- 3.12 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.
- 3.13 CLEANING
- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

- | | | |
|---|--|---|
| <u>1.1 RELATED SECTIONS</u> | .1
.2
.3
.4 | Section 04 05 00 – Common Work Results for Masonry.
Section 04 05 12 – Mortar and Masonry Grout
Section 04 05 19 – Masonry Anchorage and Reinforcing.
Section 04 21 13 – Brick Masonry. |
| <u>1.2 REFERENCES</u> | .1
.1
.2
.1
.2
.3
.1 | American Society for Testing and Materials International, (ASTM).
ASTM D 2240-[05], Standard Test Method for Rubber Property - Durometer Hardness.
Canadian Standards Association (CSA International).
CAN/CSA A371-04, Masonry Construction for Buildings.
CAN/CSA-ISO 14021-00(R2204), Environmental Labels and Declarations - Self Declared Environmental Claims (Type II Environmental Labelling).
South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
SCAQMD Rule 1168-05, Adhesives and Sealants Applications. |
| <u>1.3 ACTIVE AND INFORMATIONAL SUBMITTALS</u> | .1
.2
.1
.2
.3
.1
.4
.1
.1
.2 | Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
Product Data:
Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for joint fillers and lap adhesives.
Manufacturer's Instructions:
Submit manufacturer's installation instructions.
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, Canada.
Provide shop drawings consist of flashing and installation details. Indicate sizes, spacing, location and quantities of fasteners. |

- .5 Samples:
 - .1 Provide samples in accordance with Section 01 33 00 - Submittal Procedures, supplemented as follows:
 - .1 Materials: two, cured, and coloured samples, illustrating colour and colour range. Include:
 - .1 Movement joint filler.
 - .2 Lap adhesive.
 - .3 Mechanical fasteners.
 - .4 Reglets.
 - .5 Brick vents.
 - .2 Two moisture control material samples, illustrating colour and colour range, size, and shape. Include:
 - .1 Weep hole vents.
 - .2 Mortar diverters.
 - .3 Grout screens.
 - .3 Two flashing material samples, illustrating colour and colour range, size, shape, and profile. Include as specified:
 - .1 Sheet metal flashings.
 - .2 Composite flashings.
- .6 Quality Assurance Submittals:
 - .1 Test reports: submit certified test reports in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .2 Certificates: submit in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .3 Manufacturer's Instructions: submit in accordance with Section 04 05 00 - Common Work Results for Masonry, supplemented as follows:
 - .1 Submit installation instructions for fillers, adhesives, reglets, brick vents, weeps, vents, diverters, screens, and flashings.
- .7 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .8 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .9 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 04 05 00 - Common Work Results for Masonry.

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 anchorage and reinforcing materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
 - .1 Deliver reinforcement and connectors, identified in shop and placement drawings.

1.6 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Control joint filler: purpose-made elastomer 654-4 (85+ or - 5) durometer hardness to ASTM D 2240.
- .2 Lap adhesive: recommended by masonry flashing manufacturer. Use low VOC products in compliance with the SCAQMD Rule 1168
- .3 Nailing inserts: 0.6mm thick purpose made galvanized steel inserts for setting in mortar joints.
- .4 Mechanical fasteners: recommended by flashing manufacturer to suit project requirements

2.2 MOISTURE
CONTROL

- .1 Weep Hole Vents: Purpose made PVC.
- .2 Cell vents: polypropylene plastic, honeycomb design.
 - .1 Size: 9.5 mm x 63.5 mm x 85.7 mm
- .3 Colour: grey.
- .4 Mortar diverters: shaped and sized to suit cavity spaces. "Mortarstop" cavity drainage board manufactured by Polytite Manufacturing Corporation.
- .5 Grout Screens: 6 mm square monofilament screen is fabricated from high-strength, non-corrosive polypropylene polymers to isolate flow of grout in designated areas.

2.3 FLASHINGS

- .1 Through-wall Flashings: Perm-a-Barrier wall flashing membrane by:
- .1 W.R.Grace,
 - .2 Blueksin AG by Bakor
 - .3 Sopraseal Stick 1100T by Soprema.
 - .4 3015TWF by 3M
- Complete with adhesive and primer recommended by Manufacturer of flashing. Provide metal support over cavities larger than 50mm of 26GA (0.55 mm) zinc coated steel commercial quality to ASTM A526M with Z275 designated zinc coating.

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 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.

3.3 INSTALLATION: MATERIALS

- .1 Install continuous control joint fillers in control joints at locations indicated on drawings. Provide control joints at 9m maximum spacing. .
- .2 Install vent holes in vertical joints at top of veneer cavity in exterior wythes of cavity wall and masonry veneer wall construction at maximum horizontal spacing of 800mm. Do not place directly below weep holes above.
- .3 Install inserts in mortar joints at 400mm centres each way, for attachment of wall strapping. Install fasteners to suit application and in accordance with manufacturer's written installation instructions.
- .4 Reglets: install reglets at locations indicated on drawings.
- .5 Lap adhesive: apply adhesive to flashing lap joints.

3.4 INSTALLATION: MOISTURE CONTROL

- .1 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 600 mm on

centre.

- .2 Install cavity drainage board within cavity wall directly behind weep holes, immediately over flashings.
- .3 Grout screens: install purpose made diverters in cavities where indicated and as directed, size and shape to suit purpose and function.

3.5 INSTALLATION: FLASHINGS

- .1 Build in flashings in masonry in accordance with CSA-A371.
 - .1 Install flashings under exterior masonry bearing on foundation walls, slabs, shelf angles, and steel angles over openings, and at base of cavity wall and where cavity is interrupted by horizontal members or supports and as shown on drawings. Install flashings under weep hole courses and as indicated.
- .2 In double wythe masonry walls, veneered walls, and siding clad walls carry flashings from front edge of masonry or siding under outer wythe, then up backing not less than 200mm, bond to backing using manufacturer's recommended adhesive.
- .3 Where required and detailed, provide metal flashing support to adhere through wall flashing to and span over suspended steel angle vertical framing.
- .4 Lap joints 150mm and seal full overlap with adhesive.
- .5 Turn up ends of flashings at ends to form end dams at lintels, sills and wall ends to prevent water from travelling horizontally past flashing ends.(i.e. at sills of openings/windows).
- .6 Install over horizontal firestops within exterior wall cavities.

3.4 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED SECTIONS**
- .1 Section 04 05 00 – Common Work Results for Masonry.
 - .2 Section 04 05 12 – Mortar and Masonry Grout.
 - .3 Section 04 05 19 – Masonry Anchorage and Reinforcing.
 - .4 Section 04 05 23 – Masonry Accessories.
- 1.2 REFERENCES**
- .1 American Society for Testing and Materials International (ASTM).
 - .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).
 - .1 Technical Note No. 20-2006, Cleaning Brick Masonry.
 - .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.
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .3 Manufacturer's Instructions.
 - .1 Submit manufacturer's installation instructions in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .4 Samples:
 - .1 Provide unit samples in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4 QUALITY ASSURANCE**
- .1 Provide Certificates: in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .2 Test and Evaluation Reports: submit certified test reports in accordance with Section 04 05 00 - Common Work Results for

Masonry, supplemented as follows:

- .3 Pre-Installation Meetings: conduct pre-installation meeting in accordance with Section 04 05 00 - Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry.
- .5 Delivery, Storage, and Handling:
 - .1 Deliver, store and handle brick unit masonry in accordance with Section 01 61 00 - Common Product Requirements.

1.5 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

1.6 SITE CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURED
UNITS

- .1 Face brick.
 - .1 Burned clay brick: to CAN/CSA A82.1.
 - .2 Brick Veneer Type 1 (**BVN**) — Meridian Brick, Williamsburg MK II.
 - .3 Size: CSR Size: 90mm deep x 70mm high x 225mm long.
 - .4 Masonry to be manufactured minimum 90 days prior to installation.
 - .5 Manufacturer shall be responsible for providing brick units which meet the requirements of item 3.4.14 Tolerances. Replace all brick deemed to not to comply with stated tolerances.

- .2 Stone:
 - .1 To match existing Adair Limestone, Sepia colour, Fleuri Pattern in a Rocked Face texture, by Arriscraft. Stones at beginning and end of courses to have finished ends.
- .3 Reinforcement:
 - .1 Reinforcement in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .4 Connectors:
 - .1 Connectors in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .5 Flashings:
 - .1 Flashing: in accordance with Section 04 05 23 - Masonry Accessories.
- .6 Mortar Mixes:
 - .1 Mortar and mortar mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- .7 Grout Mixes:
 - .1 Grout and grout mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- .8 Cleaning Compounds:
 - .1 Use low VOC products in compliance with SCAQMD Rule 1168.
 - .2 Compatible with substrate and acceptable to masonry manufacturer for use on products.
 - .3 Cleaning compounds compatible with brick masonry units and in accordance with manufacturer's written recommendations and instructions.

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 substrates.

3.2 PREPARATION

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

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 INSTALLATION

- .1 Construction to conform to CAN/CSA A371.
- .2 Bond: Typical bond is stretcher. Refer to elevations for soldier course locations.
- .3 Coursing height: 240 mm for three bricks and three joints and as indicated.
- .4 Jointing: concave
- .5 Mixing and blending: mix units within each pallet and with other pallets to ensure uniform blend of colour and texture.
- .6 Clean unglazed clay masonry as work progresses.
- .7 Reinforcement:
 - .1 Install reinforcing in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .8 Connectors:
 - .1 Install connectors in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .9 Flashings:
 - .1 Install flashings in accordance with Section 04 05 23 - Masonry Accessories.
- .10 Mortar Placement:
 - .1 Place mortar in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- .11 Grout Placement:
 - .1 Place grout in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- .12 Repair/Restoration:
 - .1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.
- .13 Field Quality Control:
 - .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry
 - .2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .14 Tolerances:
 - .1 To CAN/CSA A371 unless noted below which shall

govern.

- .2 Cull out masonry units which do not meet the range of acceptance from the reviewed mockup. Remove units which are chipped cracked, have broken corners, excessive colour and texture variation, and size/deformation variations which are visible when viewed 3 meters from wall face.

3.5 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 Clean unglazed clay masonry: 10 m² area of wall designated by Consultant as directed below and leave for one week. If no harmful effects appear and after mortar has set and cured, protect windows, sills, doors, trim and other work, and clean brick masonry as follows.
 - .1 Remove large particles with wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
 - .2 Scrub with solution of 25 mL trisodium phosphate and 25 mL household detergent dissolved in 1 L of clean water using stiff fibre brushes, then clean off immediately with clean water using hose. Alternatively, use proprietary compound recommended by brick masonry manufacturer in accordance with manufacturer's directions.
 - .3 Repeat cleaning process as often as necessary to remove mortar and other stains.
 - .4 Use acid solution treatment for difficult to clean masonry as described in Technical Note No.20 by the Brick Industry Association. Test selected area prior to proceeding to determine effectiveness.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.6 PROTECTION

- .1 Brace and protect brick masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED SECTIONS**
- .1 Section 04 05 00 - Common Work Results for Masonry.
 - .2 Section 04 05 19 - Masonry Anchorage and Reinforcing.
 - .3 Section 05 51 29 - Metal Stairs, Ladders and Balustrades
 - .4 Section 09 91 13 - Exterior Painting
 - .5 Section 09 91 23 - Interior Painting.
- 1.2 REFERENCES**
- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A 53/A 53M-07, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 307-07b, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .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 CAN/CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16.09, Limit States 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 (R2006), Welded Steel Construction (Metal Arc Welding) (Imperial Version).
 - .4 The Environmental Choice Program
 - .1 CCD-047-98 (R2005), Paints, Surface Coatings.
 - .2 CCD-048-98 (R2006) , Surface Coatings - Recycled Water-borne.
- 1.3 SUBMITTALS**
- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
 - .1 For finishes, coatings, primers and paints.

- .2 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - .3 Each shop drawing submitted shall bear the stamp and signature of a qualified Professional Engineer registered in the Province of Ontario.
- .3 Submit Contractor's Engineer certificate/ written report, within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL. Certificate/report shall be stamped and signed by qualified professional engineer registered in the province of Ontario.

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.
- .4 Site Meetings: as part of Contractor's Services as described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

.2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.6 WASTE MANAGEMENT
AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A 53/A 53M standard weight , galvanized finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A 307.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.
- .7 Stainless Steel tubing: to ASTM A269, Type 304L commercial grade. Seamless weld with AISI No. 4 finish.

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 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.4 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.

2.5 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

2.6 ANGLE LINTELS

- .1 Steel angles: galvanized, sizes indicated for openings. Provide 150 mm minimum bearing at ends.
- .2 Weld or bolt back-to-back angles to profiles as indicated.
- .3 Finish: galvanized.
- .4 Refer to structural drawings for size and details of angle lintels, hangers and corner lintels and suspended lintels.

2.7 PIPE RAILINGS

- .1 Steel pipe: 38 mm nominal outside diameter, formed to shapes and sizes as indicated.

- .2 Galvanize exterior pipe railings after fabrication. Shop coat prime interior railings after fabrication.
- .3 Railings, Balustrades, and guardrails at stairs as detailed. Refer also to Section 05 51 29.
- .5 Railings to be site painted.

2.8 ACCESS LADDERS

- .1 Stringers: 65 x 10mm mm thick, steel plate.
- .2 Steel Rungs: 20 mm diameter, welded to stringers at 300 mm on centre.
- .3 Brackets: sizes and shapes as indicated, weld to stringers at 900 mm on centre, complete with fixing anchors. 230x102x11x76 mm brackets at 900 mm o/c vertically and 64x64x6x64 mm angles at base of each stringer
- .4 Galvanize finish for exterior, prime paint for interior.
- .5 Galvanize exterior ladders after fabrication
- .6 Fabricate and provide safety cage around access ladders for all ladders over 3 metres in length.

2.10 LATERAL SUPPORT CLIPS FOR MASONRY

- .1 See Structural general notes for requirements, provide as required by CSA-A371.
- .2 Finish: Shop primed.

2.17 SHELF ANGLES

- .1 Provide and install shelf angles at slab edges to support brick veneer cladding. Shelf angles to be galvanized bent steel plate of size indicated on structural drawings.
- .2 Cast shelf angles into edge of floor slabs with nelson stud anchors as detailed on structural drawings.

PART 3 - EXECUTION

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.

- .2 Erect metal work 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 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 INSTALLATION

- .1 Install all items listed under Part 2 of this Section and as indicated on drawings as per the reviewed shop drawings.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from Contractor's Engineer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide Contractor's Engineer field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

**1.1 RELATED
SECTIONS**

- .1 Section 06 20 00 - Finish Carpentry
- .2 Section 07 52 00 - Modified Bituminous Membrane Roofing
- .3 Section 08 11 00 - Metal Doors and Frames
- .4 Section 08 14 16 - Flush Wood Doors
- .5 Section 08 71 00 - Door Hardware

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI/NPA A208.1-2009, Particleboard, Mat Formed Wood.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 653/A 653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
 - .2 ASTM D 1761-06, Standard Test Methods for Mechanical Fasteners in Wood.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3-M87, Hardboard.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A247-M86 (R1996) Insulating Fiberboard.
 - .2 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
 - .3 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA O112 Series-M1977(R2006), CSA Standards for Wood Adhesives.
 - .5 CSA O121-08, Douglas Fir Plywood.
 - .6 CSA O141-05,(R2009) Softwood Lumber.
 - .7 CSA O151-09, Canadian Softwood Plywood.
 - .8 CSA O153-M1980(R2008), Poplar Plywood. .
 - .9 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.
- .5 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .6 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 SUBMITTALS

- .1 Submit Submittal submissions: in accordance with Section

01 33 00 - Submittal Procedures.

1.4 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 in accordance with CSA and ANSI standards.

1.5 DELIVERY,
STORAGE, AND
HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

**2.1 FRAMING AND
STRUCTURAL MATERIALS**

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% (S-dry) or less in accordance with the following standards:
 - .1 CSA 0141,
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Glued end-jointed (finger-jointed), are not acceptable for use on this project without written approval from the consultant.
- .3 Composite wood products and laminate adhesive to contain no added ureaformadelhyde.
- .4 Furring, blocking, nailing strips, grounds, rough bucks cants, curbs, fascia backing and sleepers:
 - .1 S2S is acceptable.
 - .2 Board size: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.

2.2 PANEL MATERIALS

- .1 Composite wood products and laminate adhesive to contain no added ureaformadelhyde.
- .2 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.0.
- .3 Douglas fir plywood (DFP): to CSA O121, standard construction
- .4 Canadian softwood plywood (CSP): to CSA O151, standard construction.

- .5 Poplar plywood (PP): to CSA O153, standard construction.
- .6 Interior mat-formed wood particleboard: to ANSI 208.1.
- .7 Mat-formed structural panelboards (OSB wafer): to CAN3-O437.0.
- 2.3 ACCESSORIES
- .1 Nails, spikes and staples: to CSA B111.
- .2 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .4 Sealants: in accordance with Section 07 92 10 – Joint Sealants
.1 Maximum allowable VOC limit 250 g/L. All sealants shall comply with SCAQMD 1168 requirements.
- .5 General Purpose Adhesive: to CSA 0112 Series. Maximum allowable VOC limit 70 g/L. All adhesives shall comply with SCAQMD 1168 requirements. All aerosol adhesives to comply with Green Seal Standard for Commercial adhesives.
- 2.4 FASTENER FINISHES
- .1 Galvanizing: to CAN/CSA-G164 ASTM A 653, use galvanized fasteners for exterior work pressure-preservative treated lumber.
- .2 Stainless steel: use stainless steel where indicated.
- 2.6 WOOD PRESERVATIVE
- .1 SCAQMD Rule #1113 - Architectural Coatings.
- .2 Maximum allowable VOC limit 350 g/L.
- 2.7 FIRE RETARDENT TREATMENT
- .1 Pressure impregnation fire retardent material (FRT): Wood and plywood where specified or indicated and where required by authorities having jurisdiction.
- .2 Vacuum pressure impregnate wood with fire retardent treatment in accordance with CAN/CSA-080, C20 for lumber and C27 for plywood. Acceptable products: “Dricon” fire retardent chemicals for wood which is concealed in final work.
- .3 Provide flame spread rating of 25 or less. Provide ULC or WHI label for treated lumber and plywood as received from the

pressure treatment plant. Including identification colour dye in the fire retardent chemicals for wood which is concealed in the final work.

- .4 Pressure treat materials before final milling and kiln dry after treatment to the specified moisture content.
- .5 Do not expose pressure treated materials to dampness between time of treatment and time that finish is applied. Remove surface salt deposits before finishing.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Store wood products.

3.2 INSTALLATION

- .1 Comply with requirements of OBC 2006, Part 3 and Part 9 supplemented by following paragraphs.
- .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 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .6 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding door tracks, electrical equipment mounting boards, wall mounted door hardware (wall stops), window coverings to all windows at each window head location and other work as required. Typical backing shall be sheet metal as specified under Section 09 22 16. Apply wood blocking only where indicated on drawings and directed by General Contractor.
- .7 Install furring to support elements applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
 - .1 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. Refer to drawing details for requirements.

- .9 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .10 Install sleepers as indicated.
- .11 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.
- .12 Install plywood backing sheets to washrooms as indicated and as noted below to provide solid backing for grab bars and as per O.B.C. 3.3.4.9.
 - .1 Provide blocking at water closet to accommodate future grab bars installed as per O.B.C. 3.8.3.8.(3)(a) and (c)

3.3 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.

3.4 SCHEDULES

- .1 Electrical equipment mounting boards:
 - .1 Plywood, DFP or CSP grade, square edge 19 mm thick, fire treated pressure impregnated fire retardant material for all electrical and security equipment mounting boards.
- .2 Frame window and door rough openings using exterior grade plywood mounted to wood stud framing.
- .3 Wood blocking for interior elements identified under 3.2.6 and 3.2.12 as directed by the General Contractor. Wood blocking is an option to replace sheet metal blocking specified under Section 09 22 16. General Contractor will determine which type of blocking is to be used.

END OF SECTION

Pre-Engineered Roof Trusses & Floor Joists

- .1 Design roof trusses and bracing, bridging and connectors in accordance with CAN3-086-M84, to safely carry live loads for building locality as ascertained by O.B.C. Supplement No. 1, Climatic Information for Building Design in Canada.
- .3 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.
- .4 Submit shop drawings. Each shop drawing submitted shall bear the stamp of a qualified Professional Engineer registered in the Province of Ontario. Indicate species, sizes, and stress grades of lumber used as joist members. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Submit stress diagram indicating design load on each tress member, special loads, allowable stress increase and deflection limits. Submit print-out of computer design. Indicate arrangement of webs or other members to accommodate ducts and other specialties. Contractor to submit layout drawings to City building inspector prior to fabrication. Floor joist shop drawings to be reviewed by architect & structural engineer prior to installation.
- .5 Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracing to prevent bending or overturning of trusses during transit and storage.
- .6 Lumber: to O.B.C. requirements, with maximum moisture content of 10% at time of fabrication and in accordance with the following standards: C.S.A. 0131-1970, NLGA Standard Grading Rules for Canadian Lumber, 1980.
- .7 Fastenings: to CAN3-086-M84.
- .8 Fabricate roof trusses in accordance with reviewed shop drawings.
- .9 Install in accordance with approved manufacturer's instructions.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 The work of this Section includes all labour, materials, tools and equipment as required for a complete project related to the supply and installation of carpentry and woodworking elements including but not limited to the following:
- .1 Interior finish carpentry trim including window sills and wood handrails and exterior wood brackets
 - .2 Interior wood doors and frames, supply and install. Refer to Section 08 14 16
 - .3 Installation of door hardware as directed by General Contractor.
 - .4 Supply and installation of washroom accessories..

1.2 RELATED REQUIREMENTS

- .1 Section 06 10 00 – Rough Carpentry
- .2 Section 06 40 00 – Architectural Woodwork
- .3 Section 08 00 00 – Door Schedule
- .4 Section 08 11 00 – Metal Doors and Frames
- .5 Section 08 14 16 – Flush Wood Doors
- .6 Section 08 71 00 – Door Hardware
- .7 Section 09 91 23 – Interior Painting
- .8 Section 10 00 00 – Manufactured Specialties
- .9 Section 10 28 10 – Toilet and Bath Accessories Room Finish Schedule

1.3 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-09, Particleboard.
 - .2 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.
 - .3 ANSI/HPVA HP-1-10, American National Standard for Hardwood and Decorative Plywood.
 - .4 ANSI Z124-6-5.2 1997 Stain Resistance.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Quality Standards, 8th edition, version 1.0 2009.
- .3 ASTM International
 - .1 ASTM E 1333-10, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
 - .2 ASTM D 2832-92(R2011), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
 - .3 ASTM D 2369-10e1, Standard Test Method for Volatile

Content of Coatings.

- .4 ASTM D 5116-10, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .5 ASTM G21 Fungal Resistance, Method A, B no growth.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3-M87, Hardboard.
 - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .5 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 O121-08, Douglas Fir Plywood.
 - .4 CSA O141-05(R2009), Softwood Lumber.
 - .5 CSA O151-09, Canadian Softwood Plywood.
 - .6 CSA O153-M1980(R2008), Poplar Plywood.
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .7 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress 2011.
- .8 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .9 National Electrical Manufacturers Association (NEMA)
 - .1 ANSI/NEMA LD-3-05, High Pressure Decorative Laminates (HPDL).
- .10 ISSDA-2 Classification and Standards Publication of Solid Surfacing Material.
- .11 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
 - .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames.
- .12 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.4 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 plywood, particleboard, OSB, MDF and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
 - .1 Indicate details of construction, profiles, jointing, fastening, locations of exposed fasteners, and other related details.
 - .2 Indicate materials, thicknesses, finishes and hardware.
 - .3 Indicate mechanical and electrical service routes, service outlets, cutout locations, and sizes.
 - .4 Include erection drawings, plans, elevations, section, and details as applicable.
- .4 Samples:
 - .1 Submit for review and acceptance..
 - .2 Submit duplicate 300 x 300 mm samples of:
 - .1 Each type of wood to receive a stained or natural finish.
 - .2 Each colour, pattern, gloss, and texture of plastic laminate, in manufacturer's standard tag size.
 - .3 laminated plastic joints, edging, cutouts and postformed profiles.
 - .4 Melamine surfaced board, edging and postformed profiles.
- .5 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
- .6 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants used in building, showing compliance with VOC and chemical component limits or restrictions requirements.
 - .2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, and laminate adhesives used in building, stating that they contain no urea-formaldehyde.
- .7 Provide maintenance data for laminate work for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.5 QUALITY
ASSURANCE

- .1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
- .3 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada to CAN/ULC-S104 and CAN/ULC-S105.
- .4 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .1 Shop prepare minimum two (2) wood wall panels c/w reveal and edge trims, and install where directed by Consultant.
 - .2 Allow 24 hours for inspection of mock-up by Consultant before proceeding with Work.
 - .3 When accepted, mock-up will demonstrate minimum standard for Work.
 - .4 Do not proceed with work prior to receipt of written acceptance of mock-up by Consultant.
 - .5 Mock-up may remain as part of finished work.

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.
 - .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 with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Deliver, store, and handle finish carpentry in accordance with the AWMAC Quality Standards. Control the temperature and humidity in accordance with AWMAC recommendations, before, during and after finish carpentry delivery, and also during storage and installation.
 - .3 Store and protect wood products from nicks, scratches,

and blemishes.

.4 Cover finished plastic laminate work with heavy kraft paper or put in cartons during shipment. Protect installed surfaces by approved means. Do not remove until immediately before final inspection.

.5 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 WARRANTY

.1 Warrant the work of this Section in accordance with GC12.3 but for the time periods specified following.

.2 Contractor's Warranty: Warrant that the work of this section will not warp or delaminate for a period of two (2) years from the date of Substantial Completion of the contract. Make all necessary repairs and replacements at no cost to the owner.

.3 Provide solid surfacing material manufacturer's 10 year limited warranty for replacement of defective material. Provide Contractor's warranty for material and labour for a period of five (5) years from the date of Substantial Completion of the Contract. Warrant that solid surfaces will not crack, delaminate, or discolour.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Softwood Lumber: To CAN/CSA 0141 and National Lumber Grades Authority requirements, with maximum moisture content on 7% for interior work, 12% for exterior work, yard lumber selected for paint finish, pine species, to AWMAC custom grade, "C" select or better (Paragraph 112C). Finger-jointed material unacceptable.

.2 Hardwood: To National Hardwood Lumber Association (NHLA) requirements, moisture content of maximum 7% for interior.
.1 Maple: To AWMAC custom grade.

.3 Hardwood plywood: To CSA 0115-1982 Maple, rotary cut, Type II bond, formaldehyde free. Good two sides where exposed to view both sides. 19mm unless otherwise called for. Plywood

resin to contain no added urea-formaldehyde.

- .4 Douglas Fir or Poplar Plywood: To CSA 0121, good two sides, select sheathing, formaldehyde free, 19mm thick unless otherwise called for. Plywood resin to contain no added urea-formaldehyde.
- .5 Laminated Plastic for Flatwork: To CAN3-A172-M79 Grade GP Type HD 1.5mm thick; suede finish colours; pattern as indicated. Backing sheet; min. 0.5mm thick, sanded surface, of same manufacturer as facing sheets.
- .6 Laminated Plastic for Post Formed Work: To CAN3-A172-M79. Grade PF, Type S, 1.25mm thick, otherwise as for flatwork.
- .7 Laminated Plastic Adhesive: As recommended by plastic laminate manufacturer, water based.
- .8 Hardboard: To CAN/CGSB – 11.3-M87, tempered, 6mm, perforated.
- .9 Core Hardwood Plywood: Provide PureBond® process domestic veneer core hardwood plywood as manufactured by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>).
- .10 Particleboard Core Hardwood Plywood: Provide phenolic particleboard core hardwood plywood assembled with PureBond® formaldehyde-free technology by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>) or Vesta by Flakeboard, www.flakeboard.com
- .11 Medium Density Fiberboard (MDF) Core Hardwood Plywood: Provide phenolic or MDI bonded MDF-core hardwood plywood assembled with PureBond® formaldehyde-free technology by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>) or Superior MDF by Flakeboard, www.flakeboard.com
- .12 Multi-Layered Core Hardwood Plywood: Provide specialty all hardwood European style (Europly PLUS™) high-ply-count birch veneer core blank with a phenolic-bonded platform to assure a no-added urea-formaldehyde panel, with face and back veneers laminated with PureBond® formaldehyde-free technology, as manufactured by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>).

- .13 Combi-Core Hardwood Plywood: Provide panels constructed of veneer core inner plies with phenolic-bonded MDF crossbands; panel shall offer similar strength and stability to veneer core but shall have the void-free surface quality of PBC or MDF; panel shall provide excellent substrate for thin-sliced woods and rotary woods with face and back veneers laminated with PureBond® formaldehyde-free technology; Classic Core™ as manufactured by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>).

2.2 ACCESSORIES

- .1 Nails and staples: to CSA B111; galvanized to ASTM A 123/A 123M for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.
- .2 Wood screws: steel, type and size to suit application.
- .3 Splines: metal.
- .4 Adhesive and Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .1 Provide adhesives, sealants, and sealant primers with VOC quantities lower than stated in SCAQMD Rule #1168, current edition.
- .2 Provide primers, paints, sealers, coatings and wood finishes with VOC quantities lower than limits stated in Green Seal's Standards GS-3 and GS-11 and SCAQMD Rule #1113, current editions

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with manufacturer's written instructions. Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Do finish carpentry to Quality Standards of (AWMAC).
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .3 Form joints to conceal shrinkage.

3.3 CONSTRUCTION

- .1 Fastening:
 - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
 - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

- .2 Standing and running trim:
 - .1 Install door and window trim in single lengths without splicing.

- .3 Interior and exterior frames:
 - .1 Set frames with plumb sides and level heads and sills and secure.

- .4 Handrails, wall rails and bumper rails.
 - .1 Install wall mounted handrails c/w premanufactured wall brackets (by this section) and wood handrails to steel and glass railings as detailed.
 - .2 Make joints hair line, dowelled and glued.
 - .3 Install support brackets as indicated
 - .4 Install metal backing plates between studs at bracket locations to ensure proper support for brackets and bolts or self-tapping screws.
 - .5 Secure using counter sunk screws plugged with matching wood plugs.

- .7 Shelving:
 - .1 Install shelving on ledgers.

- .8 Hardware:
 - .1 Install hardware specified under this section and Section 08 71 00 as per hardware manufacturer's guidelines for proper operation.

- .9 Washroom Accessories:
 - .1 Install washroom accessories as per manufacturer's guidelines for proper operation.

3.4 FINISH CARPENTRY
SCHEDULE

- .1 Standing and running trim:

- .1 Interior Door Trims:
 - .1 Grade: Custom.
 - .2 Solid stock: profile as indicated.
- .2 Interior Door Frames:
 - .1 Grade: Custom.
 - .2 Frames to be solid wood pine or birch species.
 - .3 Construction:
 - .1 Profile:AWMAC Design Detail Sheet No.2 S4S and stop minimum, thickness 19mm
 - .2 Corner: AWMAC Design Detail Sheet No.1, Rabbet.
- .3 Window Sills:
 - .1 19mm x required width No. 1 Grade Pine at all windows.
 - .2 38mm x 38mm No. 1 Grade Pine bullnose, extending 75mm beyond finished opening on both sides.
 - .3 67mm x 16mm No. 1 Grade Pine apron below bullnose, full width of opening.
 - .4 Install casing in single lengths without splicing.
- .4 Exterior Trim
 - .1 19mm by indicated width. No. 1 Grade Pine.

3.5 EXTERIOR TRIM

- .1 Use continuous lengths wherever possible.
- .2 Use mitre joints at corners.
- .3 Use scarf type joints where run of trim exceeds available lumber length.
- .4 Route out or shim where required to accommodate anchors.
- .5 Back prime all exterior trim.

3.5 INSTALLATION WASHROOM ACCESSORIES

- .1 Provide manufacturer's information and templates required for installation of work of this Section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this Section in order that they function as intended.
- .2 Include reinforcing, anchorage and mounting devices required for the installation of each product.
- .3 Install work to meet manufacturer's recommended specifications, true, tightly fitting, and level or flush to adjacent surfaces, as suitable for installation. Install and secure accessories rigidly in place.

- .5 Stud Walls: Provide steel back-plate or plywood backing to stud prior to plaster or gypsum board finish. Provide plate with threaded studs or plugs.

3.6 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 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

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

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 The work of this Section includes all labour, materials, tools and equipment as required for a complete project related to the supply and installation of woodworking elements including but not limited to the following:
 - .1 Kitchen and Laundry Room Cabinets c/w countertops, wall shelves and cabinet hardware as indicated on the drawings
 - .2 Cabinets, selves and cabinet hardware at the fireplace enclosure.

1.2 RELATED REQUIREMENTS

- .1 Section 06 10 00 – Rough Carpentry
- .2 Section 06 20 00 – Finish Carpentry
- .3 Section 08 00 00 – Door Schedule
- .4 Section 08 11 00 – Metal Doors and Frames
- .5 Section 08 14 16 – Flush Wood Doors
- .6 Section 08 71 00 – Door Hardware
- .7 Section 09 00 00 – Room Finish Schedule
- .8 Section 09 91 23 – Interior Painting
- .9 Section 10 00 00 – Manufactured Specialties

1.3 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-09, Particleboard.
 - .2 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
 - .3 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.
 - .4 ANSI Z124-6-5.2 1997 Stain Resistance
- .2 ASTM International
 - .1 ASTM E 1333-10, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
 - .2 ASTM D 2832-92(R2011), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
 - .3 ASTM D 5116-10, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 (2009).
- .4 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-11.3-M87, Hardboard
- .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

- .5 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 O121-08, Douglas Fir Plywood.
 - .4 CSA O141-05(R2009), Softwood Lumber.
 - .5 CSA O151-09, Canadian Softwood Plywood.
 - .6 CSA O153-M1980(R2008), Poplar Plywood.

- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

- .7 National Electrical Manufacturers Association (NEMA)
 - .1 ANSI/NEMA LD-3-[05], High-Pressure Decorative Laminates (HPDL).

- .8 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress [2011].

- .9 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2010].

- .10 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-[A2011], Architectural Coatings.
 - .2 SCAQMD Rule 1168-[A2005], Adhesives and Sealants Applications.

- .11 ISSDA-2 Classification and Standards Publication of Solid Surfacing Material.

1.4 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 architectural woodwork and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

- .3 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .1 Scales: profiles full size, details half full size.
 - .3 Indicate materials, thicknesses, finishes and hardware.
 - .4 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
 - .4 Samples:
 - .1 Submit for review and acceptance one complete typical Kitchen cabinet unit cw drawers and doors.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit duplicate samples of solid surfacing and laminated plastic for colour selection.
 - .4 Submit duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.
 - .5 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- 1.5 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.
 - .4 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .1 Shop prepare one base cabinet unit c/w counter top, complete with hardware and shop applied finishes, and install where directed by Consultant.
 - .2 Allow 24 hours for inspection of mock-up by Consultant before proceeding with Work.
 - .3 When accepted, mock-up will demonstrate minimum standard for Work.
 - .4 Do not proceed with work prior to receipt of written acceptance of mock-up by Consultant.
 - .5 Mock-up may remain as part of finished work.
- 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.
 - .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 with manufacturer's recommendations 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.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 WARRANTY

- .1 Warrant the work of this Section in accordance with GC12.3 but for the time periods specified following.
- .2 Contractor's Warranty: Warrant that the work of this section will not warp or delaminate for a period of two (2) years from the date of Substantial Completion of the contract. Make all necessary repairs and replacements at no cost to the owner.
- .3 Provide solid surfacing material manufacturer's 10 year limited warranty for replacement of defective material. Provide Contractor's warranty for material and labour for a period of five (5) years from the date of Substantial Completion of the Contract. Warrant that solid surfaces will not crack, delaminate, or discolour.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Softwood Lumber: To CAN/CSA 0141 and National Lumber Grades Authority requirements, with maximum moisture content on 7% for interior work, 12% for exterior work, yard lumber selected for paint finish, pine species, to AWMAC custom grade, "C" select or better (Paragraph 112C). Finger-jointed material

unacceptable.

- .2 Machine stress-rated lumber is acceptable for all purposes.
- .3 Hardwood: To National Hardwood Lumber Association (NHLA) requirements, moisture content of maximum 7% for interior.
 - .1 Maple: To AWMAC custom grade.
- .4 Hardwood plywood: To CSA 0115-1982 Maple, rotary cut, Type II bond, formaldehyde free. Good two sides where exposed to view both sides. 19mm unless otherwise called for. Plywood resin to contain no added urea-formaldehyde.
- .5 Douglas Fir or Poplar Plywood: To CSA 0121, good two sides, select sheathing, formaldehyde free, 19mm thick unless otherwise called for. Plywood resin to contain no added urea-formaldehyde.
- .6 Laminated Plastic for Flatwork: To CAN3-A172-M79 Grade GP Type HD 1.5mm thick; suede finish colours; pattern as indicated. Backing sheet; min. 0.5mm thick, sanded surface, of same manufacturer as facing sheets.
- .7 Laminated Plastic for Post Formed Work: To CAN3-A172-M79. Grade PF, Type S, 1.25mm thick, otherwise as for flatwork.
- .8 Laminated Plastic Adhesive: As recommended by plastic laminate manufacturer, water based.
- .9 Hardboard: To CAN/CGSB – 11.3-M87, tempered, 6mm, perforated.
- .10 Core Hardwood Plywood: Provide PureBond® process domestic veneer core hardwood plywood as manufactured by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>).
- .11 Particleboard Core Hardwood Plywood: Provide phenolic particleboard core hardwood plywood assembled with PureBond® formaldehyde-free technology by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>) or Vesta by Flakeboard, www.flakeboard.com
- .12 Medium Density Fiberboard (MDF) Core Hardwood Plywood: Provide phenolic or MDI bonded MDF-core hardwood plywood assembled with PureBond® formaldehyde-free technology by Columbia Forest Products

(<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>) or Superior MDF by Flakeboard, www.flakeboard.com

- .13 Multi-Layered Core Hardwood Plywood: Provide specialty all hardwood European style (Europly PLUS™) high-ply-count birch veneer core blank with a phenolic-bonded platform to assure a no-added urea-formaldehyde panel, with face and back veneers laminated with PureBond® formaldehyde-free technology, as manufactured by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>).
- .14 Combi-Core Hardwood Plywood: Provide panels constructed of veneer core inner plies with phenolic-bonded MDF crossbands; panel shall offer similar strength and stability to veneer core but shall have the void-free surface quality of PBC or MDF; panel shall provide excellent substrate for thin-sliced woods and rotary woods with face and back veneers laminated with PureBond® formaldehyde-free technology; Classic Core™ as manufactured by Columbia Forest Products (<http://www.columbiaforestproducts.com/Products.aspx/VeneerCore>).
- .15 Thermofused Melamine: to NEMA LD3 Grade VGL.
 - .1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
- .16 Nails and staples: to CSA B111.
- .17 Wood screws: stainless steel and steel, type and size to suit application.
- .21 Splines: wood or metal.
- .22 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
 - .1 Sealants: VOC limit 250 g/L maximum to SCAQMD Rule 1168.

2.2 GRANITE SHELF & FIREPLACE SURROUND

- .1 Granite shelf and fireplace surround as indicated in Section 09 00 00 and on drawing A8.02.

2.3 MANUFACTURED CUSTOM UNITS

- .1 Casework (Kitchen, Laundry Room and Fireplace surround cabinets).
 - .1 Fabricate caseworks to AWMAC custom quality grade.
- .2 Furring, blocking, nailing strips, grounds, and rough bucks and

sleepers.

- .1 S2S is acceptable.
 - .2 Board sizes: Standard or better grade.
 - .3 Dimension sizes: Standard light framing or better grade.
- .3 Framing hardwood species, NHLA select grade.
- .4 Finish: Plastic Laminate: To be selected from Arborite or Formica or Nevamar.
- .1 Plam-1: fireplace surround cabinets
 - .2 Plam-2: Kitchen and Laundry cabinets
 - .3 Plam-3: Kitchen and Laundry countertops
- .5 Case Bodies: (ends, gables, divisions and bottoms).
- .1 Hardwood plywood:
 - .1 Thickness: 16 and 19 mm.
 - .2 Number of plies: 7.
 - .3 Face veneer: As indicated above where exposed, white melamine where not exposed.
 - .4 Back veneer: to match face veneer
 - .5 Core: veneer.
 - .6 Bond: Type II.
 - .7 Sanding: touch sanding.
 - .8 Grain direction longitudinal. .
- .6 Backs:
- .1 Hardwood plywood:
 - .1 Thickness: 6 mm.
 - .2 Number of plies: 4.
 - .3 Face veneer: As indicated above were exposed, white melamine where not exposed.
 - .4 Back veneer: to match face veneer
 - .5 Core: veneer.
 - .6 Bond: Type II.
 - .7 Sanding: touch sanding.
 - .8 Grain direction vertical.
- .7 Doors:
- .1 Fabricate doors to AWMAC premium grade supplemented as follows:
 - .2 Hardwood plywood:
 - .1 Thickness: 19mm.
 - .2 Number of plies: 7.
 - .3 Face veneer: As indicated above
 - .4 Back veneer: to match face veneer
 - .5 Core: veneer.
 - .6 Bond: Type II.
 - .7 Sanding: touch sanding
 - .8 Grain direction vertical.
 - .3 Full height casework doors, use MDF core with matching

face veneer, 19mm thick.

- .8 Shelves:
 - .1 Hardwood plywood:
 - .1 Thickness: 19 mm.
 - .2 Number of plies: 7.
 - .3 Face veneer: As indicated above
 - .4 Back veneer: to match face veneer
 - .5 Core: veneer.
 - .6 Bond: Type II.
 - .7 Sanding: touch sanding.
 - .8 Grain direction longitudinal.
 - .2 Edge banding: provide 10 mm thick solid matching wood strip on plywood edges 12 mm or thicker, exposed in final assembly. Strips same width as plywood.
- .9 Drawers:
 - .1 Fabricate drawers to AWMAC premium grade supplemented as follows:
 - .2 Sides and Backs.
 - .1 Hardwood plywood:
 - .1 Thickness: 12 mm.
 - .2 Number of plies: 7.
 - .3 Face veneer : white melamine
 - .4 Back veneer: to match face veneer
 - .5 Core: veneer.
 - .6 Bond: Type II.
 - .7 Sanding: touch sanding.
 - .8 Grain direction longitudinal.
 - .3 Bottoms.
 - .1 Hardwood plywood:
 - .1 Thickness: 6 mm.
 - .2 Number of plies: 3.
 - .3 Face veneer: white melamine
 - .4 Back veneer: to match face veneer
 - .5 Core: veneer.
 - .6 Bond: Type II.
 - .7 Sanding: touch sanding.
 - .8 Grain direction longitudinal.
 - .4 Fronts.
 - .1 Hardwood plywood:
 - .1 Thickness: 19 mm.
 - .2 Number of plies: 7.
 - .3 Face veneer: As indicated above
 - .4 Back veneer: to match face veneer
 - .5 Core: veneer.
 - .6 Bond: Type II.
 - .7 Sanding: touch sanding.
 - .8 Grain direction vertical. .

2.7 FABRICATION

- .1 Set nails and countersink screws apply 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 2400mm. 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.
- .12 Apply laminated plastic liner sheet to interior of cabinetry.

2.8 CABINET HARDWARE

- .1 Use only manufacturer's product for all similar items.
- .2 Supply all necessary screws, bolts, expansion shields, and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastenings devices to match finish of hardware.

- .4 Use fasteners compatible with material through which they pass.
- .5 Hinges: Blum Modul 100° hinge, all-metal, concealed casework hinges, 6-way adjustment, full overlay and half overlay hinges as required. Provide one self-closing hinge per door. All hinges to swing 100 degrees.
- .6 Pulls: As per Section 09 00 00
- .4 Elbow catch: Type B03023 similar to type 2 in zinc 604. Touch or secret panel latch, brushed nickel finish
- .5 Roller catches type B03091 finish to 626. Roller or magnetic touch or secret panel catch, brushed nickel finish.
- .6 Adjustable shelf standards unless noted, type B04071-KV #255 2C.
- .7 Shelf rests unless noted, type B04081-KV #256 2C. Shelf rest installed in vertical recessed adjustable shelf standards, with closed shelf rests, finished to chrome plated or stainless steel.
- .8 Drawer slides: Type B05051-KV #1429 x LTS heavy duty, full extension, side mounted. Soft touch full extension units in residential suites.
- .10 Drawer and door locks to be Cam Lock type to suit application. Locks to be similar to E07261. Key to be removable in locked and unlocked positions. Cylinders to be keyed alike per room and all cabinet keys to be master keyed. Finish 626. Provide cabinet locks on all cabinet work.
- .11 Buffers (Doors and Drawers): Blum 59.0040, colour black, 2 per door and/or drawer.
- .12 Touch Latches: Magnetic Touch Latch, Richelieu ML80WHT, colour white.

2.9 FINISHING

- .1 Factory finish all cabinetwork prior to delivery to site.
- .2 Appearance of finish of stained finish to be visibly free of flow lines, streaks, sags, blisters and other surface imperfections.
- .3 Provide temporary protection to factory finished cabinetwork during shipment. Ensure that method of protection does not damage finish.
- .4 Touch up marked or abraded finish to Consultants approval. Units which are damaged beyond acceptance standard shall be replaced at no extra cost to the owner.

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. . Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Do architectural woodwork to Quality Standards of AWMAC.
- .2 Install prefinished millwork at locations shown on drawings.
 - .1 Position accurately, level, plumb straight.
- .3 Fasten and anchor millwork securely.
 - .1 Supply and install heavy duty fixture attachments for wall mounted cabinets.
- .4 Use draw bolts in countertop joints.
- .5 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.
- .6 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.
- .7 Apply water resistant building paper or bituminous coating over wood framing members in contact with masonry or cementitious construction.
- .8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

3.3 INSTALLATION COUNTERTOPS

- .1 Install in accordance with manufacturer's written installation instructions and approved Submittals. Provide templates and rough-in measurements.
- .2 Set items plumb, level, rigid and solidly adhered to substrate.
- .3 Prefit items: Adjust supports to make fit. Align joints over supporting framing.
- .4 Apply dabs of silicone on supports, place items on supports and attach

- .5 Repair or replace damaged work, which cannot be repaired to Consultant's satisfaction.
- .6 Cleaning:
 - .1 Clean and polish fabrications in accordance with Manufacturer's Written Instructions.
 - .2 Promptly remove excessive mastic and seam adhesive.
 - .3 Clean tops and faces of countertops in accordance with manufacturer's written instructions.
- .7 Provide protective coverings as recommended by Manufacturer to prevent physical damage or staining following installation for duration of the project.

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 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean millwork and cabinet work inside cupboards and drawers, and outside surfaces.
 - .2 Remove excess glue from surfaces.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 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 SECTION INCLUDES**
- .1 Materials and requirements for wall board insulation.
.1 Applied to exterior face of exterior wall sheathing, concrete block and poured concrete back-up walls to provide a continuous thermal protection to the exterior wall assembly.
- 1.2 RELATED SECTIONS**
- .1 Section 04 05 19 – Masonry Anchorage and Reinforcing
.2 Section 05 41 00 – Structural Metal Stud Framing
.3 Section 07 27 00 – Air Barriers
.4 Section 07 52 00 – Modified Bituminous Membrane Roofing
.5 Section 07 55 56 – Hot Fluid Applied Rubberized Asphalt Roofing and Waterproofing
.6 Section 07 62 00 – Sheet metal Flashing and Trim
- 1.3 REFERENCES**
- .1 American Society for Testing and Materials International (ASTM)
.1 ASTM E 96/E 96M-05, Standard Test Methods for Water Vapour Transmission of Materials.
.2 ASTM C 612-04 Standard Specification for Mineral Fibre Block and Board Thermal Insulation
- .2 Canadian General Standards Board (CGSB)
.1 CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Underwriters Laboratories of Canada (ULC)
.1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
.2 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre for Buildings.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).
- 1.4 SUBMITTALS**
- .1 Product Data:
.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00.
- .2 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.
- .3 .1 Indicate VOC's for adhesives

- .2 VOC limits for adhesives must comply with SCAQMD 1168 and Green Seal Standard for Commercial adhesives.
- .3 Submit information on recycled content of materials
- .4 Submit information on locations of manufacture and extraction.

1.5 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Convene pre-installation meeting one week prior to beginning on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordinate with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Cavity Wall Insulation:
 - .1 Extruded polystyrene (XPS) to CAN/ULC-S701, ASTM C578.
 - .2 Type: 2.
 - .3 Compressive strength: 110 kPa min.
 - .4 Thickness: 40 mm.
 - .5 Size: 1220 x 1220 mm.
 - .6 Edges: S.
 - .7 Thermal Resistance: 4.94 R Value/inch (RSI 0.87)
 - .8 Acceptable Product: Dow Styrofoam Brand Cladmate XL Extruded Polystyrene Foam Insulation.

- .2 Foundation insulation:
 - .1 Extruded polystyrene (XPS) to CAN/ULC-S701, ASTM C578.
 - .2 Type: 4.
 - .3 Compressive strength: 30 psi for vertical applications, 60psi for horizontal applications
 - .4 Thickness: 50 mm, 75mm, and 100mm as indicated.
 - .5 Size: 600 x 2400mm.
 - .6 Edges: shiplapped.
 - .7 Thermal Resistance: 5.0 Value/inch
 - .8 Acceptable Product: Dow, Styrofoam SM for vertical applications, Styrofoam Highload 60 for horizontal applications.
- .3 Roof Insulation:
 - .1 Refer to Section 07 52 00 for roofing and waterproofing assemblies and insulation requirements.
- .4 EIFS Insulation:
 - .1 Refer to Section 07 24 00 for Exterior Insulation Finish System insulation requirements.

2.2 ADHESIVE

- .1 Adhesive (for polystyrene): to CGSB 71-GP-24, Type 1, compatible to and as recommended by manufacturer of insulating board.
- .2 VOC limits as per 01 35 21.

2.3 ACCESSORIES

- .1 Mechanical Wall Fasteners: Purpose made plastic, friction fit type designed to hold insulation in place as part of masonry wall tie system (refer to Section 04 05 19) or stainless steel screw type fastener. c/w moulded plastic disc washer, minimum 25 mm diameter.
- .2 Insulation clips: impale type, preformed 50 x 50 mm Cold Rolled Carbon Steel 0.8mm thick, adhesive back, spindle of 2.5 mm dia. annealed steel, length to suit insulation, 25mm dia. washers of self locking type.

PART 3 - EXECUTION

- 3.1 MANUFACTURER'S
 - .1 Compliance: comply with manufacturer's written data, including

INSTRUCTIONS

product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

- .1 Examine substrates and immediately inform Consultant in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.
 - .2 Verify that the insulation boards and adjacent materials are compatible.
 - .3 Verify that insulation boards are in proper widths to fit between wall ties.

3.3 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry and after installation of air vapour barrier.
- .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 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.
- .5 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.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Consultant.

3.4 PERIMETER
FOUNDATION
INSULATION

- .1 Exterior application: extend boards down vertical curbs to parking garage podium slab and tightly fit into insulation boards over parking garage horizontal surfaces. Co-ordinate work with roofing/waterproofing contractor responsible for parking garage podium roof/waterproofing assembly.

3.5 CAVITY WALL
INSULATION

- .1 Install rigid insulation boards on outer surface of OSB sheathing board over Tyvek Weather arrier membrane.
- .2 Place boards in a method to maximize contact with bedding. Stagger end joints. Butt edges and ends tight to adjacent boards and to protrusions.
- .3 Fit insulation boards neatly around wall ties.
- .4 At perimeter of windows install additional layers of insulation to provide minimum R value of 8.4 to window thermal break and back aluminum section framing.
- .5 Install over impaling clips to securely hold boards in place.

3.6 SOFFIT
INSULATION

- .1 Install boards as noted in 3.5 above where detailed.
- .2 Mechanically fasten with mechanical fasteners complete with plastic washers.
- .3 Install mechanical fastening through base layer of insulation into structural slab for multiple layer insulation installations.

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 The work of this Section includes but is not limited to the all material, equipment, tools, and labour required for the supply and installation of blanket insulation to provide thermal and acoustic protection and separation.
- .2 Acoustic insulation to interior wall assemblies as indicated on the drawings. Construct all assemblies in accordance with the requirements of the labeling agency. When in doubt seek direction from the Owners' Acoustic Engineer.
- .3 Where specified in construction assembly insulation shall be installed, carefully fitted to avoid gaps and voids across the full width of the assembly.
- .4 All interior partitions enclosing vertical plumbing drainage piping shall be insulated. Drainage piping shall be wrapped with a minimum of 25mm of acoustic insulation on all sides.
- .6 At all washrooms provide and install insulation within all enclosing partitions.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 07 27 00 - Air Barriers
- .3 Section 07 84 00 - Fire Stopping
- .4 Section 09 21 16 - Gypsum Board Assemblies
- .5 Mechanical Drawing - Insulation for Mechanical Work

1.3 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 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S604-M1991, Type A Chimneys.
 - .2 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature,

specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .3 Provide information on recycled contents of materials as per Section 01 61 00 – Product Requirements
- .4 Submit information on locations of manufacture and extraction of materials as per Section 01 61 00 – Product Requirements

1.5 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Convene pre-installation meeting one week prior to beginning on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordinate with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Thermal Insulation: (Wood Stud Wall Assemblies / Attics)
 - .1 Batt and blanket mineral fibre ASTM C665 CAN/ULCS702
 - .2 Type: 1.
 - .3 Thickness: as required to achieve noted R values:
 - .1 R 24 (RSI 4.23) wall cavity

- .2 R 50 (RSI 8.8) roof - minimum per SB-10 (1 layer R22 and 1 layer R28 running perpendicular)
- .4 Non Combustible in accordance with CAN/ULC S114 and ASTM E136
- .5 Flame spread less than 25, smoke development 50
- .6 Width purpose made for fitting between studs/trusses.
- .7 Acceptable Products:
 - .1 Roxul ComfortBatt Insulation
 - .2 Certainteed Fibre Glass Building Insulation
 - .3 Owens Corning EcoTouch Pink Fibreglas Insulation

- .2 Acoustic Insulation
 - .1 Batt and blanket mineral fibre ASTM C665 CAN/ULCS702
 - .2 Type: 1.
 - .3 Thickness: as indicated
 - .4 Non Combustible in accordance with CAN/ULC S114 and ASTM E136
 - .5 Flame spread less than 25, smoke development 50
 - .6 Width purpose made for fitting between studs.
 - .7 Acceptable Products:
 - .1 Ottawa Fibre Industries - Golden Glow Acoustic Insulation
 - .2 CGC Thermafibre SAFB
 - .3 Certainteed Certasound
 - .4 Roxul AFB
 - .5 Ownes Corning Quietzone

2.2 ACCESSORIES

- .1 Insulation clips:
 - .1 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.

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 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of acoustic protection to building elements and spaces and to ASTM C 1320.

- .2 Install insulation within framing members tightly fit but not compressed.
- .3 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .4 Do not compress insulation to fit into spaces.
- .5 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.
- .6 Do not enclose insulation until it has been inspected and approved by Consultant.
- .7 Pack gaps at top of masonry partitions, except for rated fire separations, with glass fibre insulation for full thickness of wall. Install foam insulation on each side of wall as detailed on drawings.

3.3 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 requirements for application of spray foam insulation include:
 - .1 Applied to underside of floor slabs at soffit areas to form a continuous thermal and air/vapour barrier coating to the exterior soffit assembly.
 - .2 Perimeter void at shim spaces around window and door openings to completely fill void and provide thermal protection to perimeter framing.
 - .3 Applied around exterior exhaust vent duct plenums penetrating exterior walls and window assemblies.
 - .4 Apply to the back of poured concrete upstand walls and curbs to maintain thermal separation.

1.2 RELATED
SECTIONS

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- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 51 00 - Temporary Utilities
- .3 Section 01 61 00 - Common Product Requirements
- .4 Section 03 45 00 – Architectural Precast Concrete
- .5 Section 07 21 13 - Board Insulation
- .6 Section 07 27 00 - Air Barriers
- .7 Section 08 11 00 - Metal Doors and Frames
- .8 Section 08 11 16 - Aluminum Doors and Frames

1.3 REFERENCES

- .1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)
- .2 Green Seal Environmental Standards
 - .1 Standard GC-03-93, Anti-Corrosive Paints.
 - .2 Standard GS-11-97, Architectural Paints.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-04, Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102-03, 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.
 - .4 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets.
- .3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Test reports: submit certified test reports for insulation from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
 - .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.
 - .4 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL
- .4 Provide information on recycled contents of materials as per Section 01 61 00 – Product Requirements

1.5 QUALITY ASSURANCE

- .1 Applicators to conform to CUFCA Quality Assurance Program.
- .2 Qualifications:
 - .1 Installer: person specializing in sprayed insulation installations with 5 years documented experience approved by manufacturer.
 - .2 Manufacturer: company with minimum 5 years 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 Mock-up:
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up of typical wall application and application around window and door openings.

- .3 Mock-up may be part of finished work.
- .4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with sprayed insulation work.
- .4 Convene pre-installation meeting one week prior to beginning on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordinate with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .5 Health and Safety Requirements: worker protection:
 - .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
 - .2 Workers must wear protective clothing when applying foam insulation.
 - .3 Workers must not eat, drink or smoke while applying foam insulation.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance w.th Section 01 61 00 - Common Product Requirements
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- 1.7 SITE CONDITIONS
 - .1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.
 - .2 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.
 - .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
 - .4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
 - .5 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.
 - .1 Two component closed cell spray-applied rigid polyurethane foam system.
 - .2 Thermal resistance: Min. 1.15 RS1/25mm (R6.1/in)
 - .3 Class: 1 flame spread rating 25
 - .4 Perm rating: to ASTM E-96 0.9 - 1.0 perm/ 25mm
 - .5 Acceptable products:
 - .1 BASF Walltite
 - .2 Polarfoam PF-7300-0 Soya
 - .3 TigerFoam by Commercial Thermal Solutions, Inc.
- .2 Foam Insulation around Windows and Doors:
 - .1 CF812 by Hilti
- .3 Primers: in accordance with manufacturer's recommendations for surface conditions. Maximum VOC limit as per Section 01 61 00 Product Requirements

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

- .1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 compliance with the spray polyurethane Foam Alliance and manufacturer's printed instructions.
- .2 Use primer where recommended by manufacturer.
- .3 Apply spray foam insulation directly around exhaust duct plenum boxes penetrating exterior walls and where indicated on the drawings.
- .4 Apply in maximum 50mm thickness per pass. On initial application thickness of first pass shall be no more than 25mm. Allow application of spray foam to cure and cool prior to application of additional layers of insulation as per manufacturer's recommendations to achieve total thickness to meet thermal values specified.
- .6 Apply sprayed foam insulation in total thickness to achieve a minimum R value of 20 on wall areas and 30 on soffit areas

unless indicated otherwise.

- .7 Apply spray foam insulation around supply and exhaust ductwork penetrations through exterior walls. The work of this section is to seal and thermally protect the connection of ductwork to the exterior wall. Apply insulation after ductwork is in place.
- 1 Fill perimeter voids of windows, doors, and other exterior wall and roof penetrations and interruptions and as indicated on the drawings with foam in place insulation.
- .2 Ensure surfaces are free of dust, oil, grease, frost, loose debris. Provide temporary bracing required to prevent bowing of adjacent frames. Mask adjacent exposed surfaces against damage.
- .3 Provide adequate ventilation and protective apparel. Min. application temperature 5°C.
- .4 Fill gaps, cracks, holes with foam. Make allowance for expansion of foam. Install foam into gaps and shim space in layered application to ensure full depth of joint is sealed. Allow each layer to cure before next layer is applied. Cut back excess foam after curing. Tool foam only when tack free.

3.3 APPLICATION AT PERIMETER OF DOORS AND WINDOWS

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 at stages listed.
 - .1 After delivery and storage of products and when preparatory work and mock-up is completed but before general installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of work, after cleaning is carried out.
 - .4 Provide written report for each site review.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

Dryvit PD / NC EIFS System is the standard of acceptance only and alternatives proposed must meet or exceed the properties of the base system. Alternate systems will be considered only on the basis they very clearly demonstrate similarity to the specified Dryvit system and conformance to the “Pro Demnity” exclusion published September 16, 2009 and CCMC approvals and testing before acceptance. Manufacturers of alternate EIFS systems are responsible for clearly demonstrating compliance with all subsections of this specification section. The work of this section describes a system which is to be single source / single responsibility.

1.1 Related Sections

1. Concrete – Refer to Structural drawings
2. Unit Masonry – Section 04 22 00
3. Structural Metal Stud Framing – Section 05 41 00
4. Wood Framing – Section 06 10 00
5. Flashing – Section 07 62 00
6. Sealant – Section 07 92 00
7. Gypsum Board Assemblies – Section 09 21 16

1.2 References

1. CAN/ULC-S101 M89 Standard Methods of Fire Endurance Test
2. CAN/ULC-S114 Standard Method of Test for Determination of Non-combustibility in Building Materials
3. CAN/ULC-S134 Fire Test for Exterior Wall Assemblies
4. CAN/ULC-S102 Surface Burning Characteristics of Building Materials and Assemblies
5. Canadian Construction Materials Centre – Technical Guide for EIFS Evaluation
6. CAN/ULC-S716.1 Standard for Exterior Insulation and Finish Systems (Materials and Systems)
7. ASTM B 117 (Federal Test Standard 141A Method 6061) Standard Practice for Operating Salt Spray (Fog) Apparatus
8. ASTM C 150 Standard Specification for Portland Cement
9. ASTM C 297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions

10. ASTM C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
11. ASTM C 1396 (formerly C 79) Standard Specification for Gypsum Board
12. ASTM D 968 (Federal Test Standard 141A Method 6191) Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
13. ASTM D 2247 (Federal Test Standard 141A Method 6201) Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
14. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
15. ASTM D 4060 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
16. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
17. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials
18. ASTM E 119 Standard Method for Fire Tests of Building Construction and Materials
19. ASTM E 283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
20. ASTM E 330 Test Method for Structural Performance of Exterior Windows, Doors and Curtain Walls by Uniform Static Air Pressure Difference
21. ASTM E 331 Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
22. ASTM E 2098 Test Method for Determining the Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for use in Class PB Exterior Insulation and Finish Systems (EIFS), after Exposure to Sodium Hydroxide Solution.
23. ASTM E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of Exterior Insulation and Finish Systems (EIFS)
24. ASTM E 2273 Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies

25. ASTM E 2430 Standard Specification for Expanded Polystyrene (EPS) Thermal Insulation Boards for use in Exterior Insulation and Finish Systems (EIFS)
26. ASTM E 2485 (formerly EIMA Std. 101.01) Standard Test Method for Freeze-Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water-Resistive Barrier Coatings
27. ASTM E 2486 (formerly EIMA Std. 101.86) Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS)
28. ASTM G 155 (Federal Test Standard 141A Method 6151) Standard Practice for Operating-Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials
29. DSC603 Dryvit Outsulation PD System Installation Details
30. DSC131, Dryvit Expanded Polystyrene Insulation Board Specification
31. DSC151, Custom Brick™ Polymer System Specifications for Use On Vertical Walls
32. DSC152, Dryvit Cleaning and Recoating
33. DSC153, Dryvit Expansion Joints and Sealants
34. DSC159, Dryvit Water Vapor Transmission
35. DSC456, Rapidry DM™ 35-50 or DS457, Rapidry DM™ 50-75 Data Sheets
36. DSC494, Dryvit AquaFlash® System
37. Mil Std E5272 Environmental Testing
38. Mil Std 810B Environmental Test Methods
39. NFPA 268 Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
40. NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus

1.3 Definitions

- .1 Base Coat: Material used to encapsulate one or more layers of reinforcing mesh fully embedded that is applied to the outside surface of the EPS.
- .2 Building Expansion Joint: A joint through the entire building structure designed to accommodate structural movement.

- .3 Contractor: The contractor that installs the Outsulation PD System(s) to the substrate.
- .4 Dryvit: Dryvit Systems Canada, the manufacturer of the Outsulation PD System(s). To be considered the standard of acceptance and comparison for all alternative EIFS systems.
- .5 Expansion Joint: A structural discontinuity in the Outsulation PD System(s).
- .6 Finish: An acrylic-based coating, available in a variety of textures and colors that is applied over the base coat.
- .7 Insulation Board: Expanded polystyrene (EPS) insulation board, which is affixed to the substrate.
- .8 Panel Erector: The contractor who installs the panelized Outsulation PD System(s).
- .9 Reinforcing Mesh: Glass fiber mesh(es) used to reinforce the base coat and to provide impact resistance.
- .10 Sheathing: A substrate in sheet form.
- .11 Substrate: The material to which the Outsulation PD System(s) are affixed.
- .12 Substrate System: The total wall assembly including the attached substrate to which the Outsulation PD System(s) are affixed.

1.4 System Description

- .1 General: The Dryvit Outsulation PD System(s) is an Exterior Insulation and Finish System (EIFS), Class PB, utilizing a cavity wall concept with capability for moisture drainage. The system consists of a water-resistive barrier coating (air/water-resistive barrier), an adhesive, grooved expanded polystyrene insulation board, internalized moisture egress detailing, Dryvit Vent Assembly™, Dryvit AquaDuct, base coat, reinforcing mesh(es) and finish.
- .2 Methods of Installation
 - .1 Field Applied: The Outsulation PD System is applied to the substrate system in place.
 - .2 Panelized: The Outsulation PD System is shop-applied to the prefabricated wall panels.
- .3 Design Requirements:
 - .1 Acceptable substrates for the Outsulation PD System shall be:
 - .1 Exterior sheathing having a water-resistant core with fiberglass mat facers meeting ASTM C 1177.
 - .2 Exterior fiber reinforced cement or calcium silicate boards.
 - .2 Deflection of the substrate systems shall not exceed 1/240 times the span.

- .3 The substrate shall be flat within 6.4 mm (1/4 in) in a 1.2 m (4 ft) radius.
- .4 The slope of inclined surfaces shall not be less than 6:12, and the length shall not exceed 305 mm (12 in).
- .5 All areas requiring an impact resistance classification higher than "standard", as defined by ASTM E 2486 (formerly EIMA Standard 101.86), shall be as detailed in the drawings and described in the contract documents. Refer to Table 1.04.D.1.d of this specification.

- .6 Expansion Joints:
 - .1 Design and location of expansion joints in the Outsulation PD System is the responsibility of the project installer and shall be located in consultation with the project architect. As a minimum, expansion joints shall be placed at the following locations:
 - .1 Where expansion joints occur in the substrate system.
 - .2 Where building expansion joints occur.
 - .3 Where the Outsulation PD System abuts dissimilar materials.
 - .4 Where the substrate type changes.
 - .5 Where prefabricated panels abut one another.
 - .6 In continuous elevations at intervals not exceeding 23 m (75 ft).
 - .7 Where significant structural movement occurs, such as changes in roofline, building shape or structural system.

- .7 Secondary Barriers
 - .1 The use of secondary barriers is a design requirement of this system and EIFS assemblies as governed by conformance to CCMC evaluation and the provisions of CAN/ULC-S716.1 Standard for Exterior Insulation and Finish Systems Materials and Systems. This secondary barrier may also be used to provide the plane of air tightness as part of an air barrier system. All Dryvit secondary barriers meet the requirements for air barrier classification have an air leakage rate of <0.05L/s.m² @ 75Pa. Use, location and performance characteristics of the air barrier system shall be determined by the design professional and shall meet the requirements of Part 5 of the applicable Canadian (national or provincial) building code for the given project.

- 8. Terminations
 - .1 Prior to applying the Dryvit Outsulation PD System, wall openings shall be treated with Dryvit AquaFlash System or Flashing Tape. Refer to Dryvit Outsulation PD System Installation Details (DSC603).

- .2 The Outsulation PD System shall be held back from adjoining materials around openings and penetrations such as windows, doors, and mechanical equipment a minimum of 19 mm (3/4 in) for sealant application. See Dryvit's Outsulation PD System Installation Details, DSC603.
 - .3 The system shall be terminated a minimum of 203 mm (8 in) above finished grade.
 - .4 Sealants
 - .1 Shall be manufactured and supplied by others.
 - .2 Shall be compatible with the Outsulation PD System materials. Refer to current Dryvit Publication DSC153 for listing of sealants tested by sealant manufacturer for compatibility.
 - .3 The sealant backer rod shall be closed cell.
9. Vapour Barriers - The use and location of vapor retarders within a wall assembly is the responsibility of the project designer and shall comply with the requirements of Part 5 of applicable building code. The type and location shall be noted on the project drawings and specifications. Vapor retarders may be inappropriate in certain climates and can result in condensation within the wall assembly. Refer to Dryvit Publication DSC159 for additional information.
10. Dark Colors - The use of dark colors must be considered in relation to wall surface temperature as a function of local climatic conditions. Use of dark colors in high temperature climates can affect the performance of the system.
11. Flashing: Shall be provided at all roof-wall intersections, windows, doors, chimneys, decks, balconies and other areas as necessary to prevent water from entering behind the Outsulation PD System.
- .4 Performance Requirements
- .1 The Outsulation PD System has been evaluated by CCMC and is listed in CCMC Report 12874-R. Please refer to report for applicable materials and components used. In addition, the system has been tested as follows

.1 Air/Water-Resistive Barrier Coating

TEST	TEST METHOD	CRITERIA	RESULTS
Tensile Bond	ASTM C 297/E 2134 ICC ES (AC 212)*	Minimum 104 kPa (15 psi)	Substrate: Minimum 131 kPa (19 psi) Flashing: Minimum 2970 kPa (431 psi)
Freeze-thaw	ASTM E 2485/ICC-ES Proc. ICC ES (AC 212)*	No deleterious effects after 10 cycles	Passed - No deleterious effects after 10 cycles
Water Resistance	ASTM D 2247 ICC ES (AC 212)*	No deleterious effects after 14 days exposure	No deleterious effects after 14 days exposure

Project No.: 1841

Water Vapor Transmission	ASTM E 96 Proc. B ICC ES (AC 212)*	Vapor Permeable	7 perms (Backstop NT)
Air Leakage	ASTM E 283	No Criteria	0.6 l/min/m ² (0.002 cfm/ft ²)
Structural Performance	ASTM E 1233 Proc. A ICC ES (AC 212)*	Minimum 10 positive cycles at 1/240 deflection; No cracking in field, at joints or interface with flashing	Passed
Racking	ASTM E 72 ICC ES (AC 212)*	No cracking in field, at joints or interface with flashing at net deflection of 3.2 mm (1/8 inch)	Passed
Restrained Environmental	ICC-ES Procedure ICC ES (AC 212)*	5 cycles; No cracking in field, at joints or interface with flashing	Passed
Water Penetration	ASTM E 331 ICC ES (AC 212)*	No water penetration beyond the inner-most plane of the wall after 15 minutes at 137 Pa (2.86 psf)	Passed
Weathering UV Exposure	ICC ES Proc. ICC ES (AC 212)*	210 hours of exposure	Passed
Accelerated Aging	ICC ES Proc. ICC ES (AC 212)*	25 cycles of drying and soaking	Passed
Hydrostatic Pressure Test	AATCC 127 ICC ES (AC 212)*	21.6" water column for 5 hours	Passed
Surface Burning Characteristics	ASTM E 84	Flame Spread < 25 Smoke Developed < 450	Passed

*AC 212 – Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers Over Exterior Sheathing

.2 Durability

TEST	TEST METHOD	CRITERIA	RESULTS
CCMC Durability under Environmental Cyclic Conditions	CCMC EIFS Technical Guide Section 5.6.1 as per Appendix A2	No water penetration. No cracking, crazing, blistering or sagging of finish or base coat. Etc. Min 60 cycles	Passed

Abrasion Resistance	ASTM D 968	No deleterious effects after 500 liters (528 quarts)	No deleterious effects after 1000 liters (1056 quarts)
Accelerated Weathering	ASTM G 155 Cycle 1	No deleterious effects after 2000 hours	No deleterious effects after 5000 hours
	ASTM G 154 Cycle 1 (QUV)		No deleterious effects after 5000 hours
Freeze-Thaw	ASTM E 2485 (formerly EIMA 101.01)	No deleterious effects after 60 cycles	Passed - No deleterious effects after 90 cycles
	ASTM C 67 modified	No deleterious effects after 60 cycles	Passed - No deleterious effects after 60 cycles
	ASTM E 2485/ICC-ES Proc. ICC ES (AC 235)***	No deleterious effects after 10 cycles	Passed - No deleterious effects after 10 cycles
Mildew Resistance	ASTM D 3273	No growth during 28 day exposure period	No growth during 60 day exposure period
Water Resistance	ASTM D 2247	No deleterious effects after 14 days exposure	No deleterious effects after 42 days exposure
Taber Abrasion	ASTM D 4060	N/A	Passed 1000 cycles
Salt Spray Resistance	ASTM B 117	No deleterious effects after 300 hours exposure	No deleterious effects after 1000 hours exposure
Water Penetration	ASTM E 331 ICC ES (AC 235)***	No water penetration beyond the inner-most plane of the wall after 15 minutes at 137 Pa (2.86 psf)	Passed 15 minutes at 137 Pa (2.86 psf)
Water Vapor Transmission	ASTM E 96 Procedure B	Vapor permeable	EPS 5 perm-inch Base Coat* 40 Perms Finish** 40 Perms
Drainage Efficiency	ASTM E 2273 ICC ES (AC 235)***	Minimum Drainage Efficiency of 90%	Passed
<p>* Base Coat perm value based on Dryvit Genesis™ ** Finish perm value based on Dryvit Quarzputz® *** AC 235 – Acceptance Criteria for EIFS Clad Drainage Wall Assemblies</p>			

.3 Structural

TEST	TEST METHOD	CRITERIA	RESULTS
Tensile Bond	ASTM C 297/E 2134	Minimum 104 kPa (15 psi) – substrate or insulation failure	Minimum 213.6 kPa (31 psi)
Transverse Wind Load	ASTM E 330	Withstand positive and negative wind loads as specified by the building code	Minimum 4.3 kPa (90 psf)* 16 inch o.c. framing, ½ in sheathing screw attached at 203 mm (8 inch) o.c.
* All Dryvit components remain intact – for higher wind loads contact Dryvit Systems Canada.			

- .4 Impact Resistance: In accordance with ASTM E 2486 (formerly EIMA Standard 101.86):

Reinforcing Mesh/Weight g/m ² (oz/yd ²)	Minimum Tensile Strengths	EIMA Impact Classification	EIMA Impact Range		Impact Test Results	
			Joules	(in-lbs)	Joules	(in-lbs)
Intermediate - 407 (12)	54 g/cm (300)	High	10-17	(90-150)	12	(108)
Panzer [®] 15* - 509 (15)	71 g/cm (400)	Ultra High	>17	(>150)	18	(162)
Detail Short Rolls - 146	27 g/cm (150)	n/a	n/a	n/a	n/a	n/a
Corner Mesh - 244 (7.2)	49 g/cm (274)	n/a	n/a	n/a	n/a	n/a

*Shall be used in conjunction with Standard Mesh (recommended for areas exposed to high traffic).

- .5 Fire performance

TEST	TEST METHOD	CRITERIA	RESULTS
Fire Resistance	ASTM 119	No effect on the fire resistance of a rated wall assembly	Passed 1 hour Passed 2 hour
	CAN/ULC-S101	Stay in place 15 minutes	Passed*
Ignitability Noncombustibility**	NFPA 268	No ignition at 12.5 kw/m ² at 20 minutes	Passed
	CAN/ULC-S114	No flaming and retain 80% original test specimen weight	Passed

* See ITS-WH Category I and II Design Listings for system and material description, **Primus DM Only

2. The Outsulation PD components shall be tested for:
.1 Fire

TEST	TEST METHOD	CRITERIA	RESULTS
Surface Burning Characteristics	ASTM E 84	All components shall have a: Flame Spread ≤ 25 Smoke Developed ≤ 450	Passed
	CAN/ULC-S102		

- .2 Durability

TEST	TEST METHOD	CRITERIA	RESULTS
Reinforcing Mesh Alkali Resistance of Reinforcing Mesh	ASTM E 2098 (formerly EIMA 105.01)	> 21dN/cm (120 pli) retained tensile strength after exposure > 35 N/mm Initial Strength and no less than 60% Strength loss following 90 day exposure	Passed
	CCMC Mesh Criteria		Passed
EPS (Physical Properties) Density	ASTM C 303, D 1622	15.2-20.0 kg/m ³ (0.95-1.25 lb/ft ³)	Pass

Thermal Resistance	ASTM C 177, C 518	4.0 @ 4.4 °C (40 °F) 3.6 @ 23.9 °C (75 °F)	Pass Pass
Water Absorption	ASTM C 272	2.5 % max. by volume	Pass
Oxygen Index	ASTM D 2863	24% min. by volume	Pass
Compressive Strength	ASTM D 1621 Proc.	69 kPa (10 psi) min.	Pass
Flexural Strength	A	172 kPa (25 psi) min.	Pass
Flame Spread	ASTM C 203	25 max.	Pass
Smoke Developed	ASTM E 84	450 max.	Pass

1.5 Submittals

- .1 Product Data: The contractor shall submit to the owner/architect the manufacturer's product data sheets describing products, which will be used on this project.
- .2 Shop Drawings: The panel installer shall prepare and submit to the owner/architect complete shop drawings showing: wall layout, connections, details, expansion joints, and any installation sequences.
- .3 Samples: The contractor shall submit to the owner/architect two (2) samples of the Outsulation PDMD System for each finish, texture and color to be used on the project. The same tools and techniques proposed for the actual installation shall be used. Samples shall be of sufficient size to accurately represent each color and texture being utilized on the project. Sample colours in a range of darker than or lighter than may be requested by the Architect.
- .4 Test Reports: When requested, the contractor shall submit to the owner/architect copies of selected test reports verifying the performance of the Outsulation PD System.

1.6 Quality Assurance

- .1 Qualifications
 - .1 System Manufacturer: Shall be Dryvit Systems Canada. All materials shall be manufactured or sold by Dryvit and shall be purchased from Dryvit or its authorized distributors.
 - .1 Materials shall be manufactured at a facility covered by a current ISO 9001 and 14001 registration. Certification of the facility shall be done by a registrar accredited by the American National Standards Institute, Registrar Accreditation Board (ANSI-RAB).
 - .2 Contractor: Shall be knowledgeable in the proper installation of the Dryvit Outsulation PD System and shall be experienced and competent in the installation of Exterior Insulation and Finish Systems. Additionally, the contractor shall possess a current Outsulation PD System Trained Contractor Registration Certificate* issued by Dryvit Systems Canada.
 - .3 Insulation Board Manufacturer: Shall be listed by Dryvit Systems Canada, shall be capable of producing the expanded polystyrene (EPS) in accordance with the current Dryvit Specification for Insulation Board, DSC131, and shall subscribe to the Dryvit Third Party Certification and Quality Assurance Program.

- .2 Regulatory Requirements:
 - .1 The EPS shall be separated from the interior of the building as required by code
 - .2 The use and maximum thickness of EPS shall be in accordance with the applicable building code limitations and Dryvit's related test configuration. Where CAN/ULC-S134 is applicable, maximum allowable thickness is 102mm (4 in). Where compliance to CAN/ULC-S101 in conjunction with noncombustible material can be applied, maximum allowable EPS thickness is 152mm (6 in).
- .3 Certification
 - .1 The Outsulation PD System shall be recognized for the intended use by SCC Accredited Certification Organization.
- .4 Mock-Up
 - .1 The contractor shall, before the project commences, provide the owner/architect with a mock-up for approval.
 - .2 The mock-up shall be of suitable size as required to accurately represent the products being installed, as well as each color and texture to be utilized on the project.
 - .3 The mock-up shall be prepared with the same products, tools, equipment and techniques required for the actual applications. The finish used shall be from the same batch that is being used on the project.
 - .4 The approved mock-up shall be available and maintained at the jobsite.
- .5 Third-Party Inspection – For Outsulation PD, the owner shall employ the services of a third party inspector who shall at minimum follow the inspection guidelines as outlined in the Dryvit Infinity Program

1.7 Delivery Storage and Handling

- .1 All Dryvit materials shall be delivered to the job site in the original, unopened packages with labels intact.
- .2 Upon arrival, materials shall be inspected for physical damage, freezing or overheating. Questionable materials shall not be used.
 - .1 Materials shall be stored at the jobsite in a cool, dry location, out of direct sunlight, protected from inclement weather and other sources of damage. Minimum storage temperature shall be as follows:
 - .1 Demandit™, Revyvit™: 7 °C (45 °F)
 - .2 Ameristone™, TerraNeo™ and Limestone™: 10 °C (50 °F)
 - .3 DPR, PMR™ and E™ Finishes, Color Prime™, Primus, Genesis and NCB™: 4 °C (40 °F)
 - .4 Custom Brick™ Finish: refer to Custom Brick Polymer Specification, DSC151
 - .5 For other products, refer to specific product data sheets

2. Maximum storage temperature shall not exceed 38 °C (100 °F). **NOTE: Minimize exposure of materials to temperatures over 32 °C (90 °F). Finishes exposed to temperatures over 43 °C (110 °F) for even short periods may exhibit skinning, increased viscosity and should be inspected prior to use.**

1.8 Project Conditions

- .1 Environmental Requirements
 - .1 Application of wet materials shall not take place during inclement weather unless appropriate protection is provided. Protect materials from inclement weather until they are completely dry.
 - .2 At the time of application, the minimum air and wall surface temperatures shall be as follows:
 - .1 Demandit, Revyvit: 7 °C (45 °F)
 - .2 Ameristone, TerraNeo and Limestone: 10 °C (50 °F)
 - .3 DPR, PMR and E Finishes, Color Prime, Primus, Genesis and NCB: 4 °C (40 °F)
 - .4 Custom Brick Finish: refer to Custom Brick Polymer Specification, DS151
 - .5 For other products, refer to specific product data sheets
 - .3 These temperatures shall be maintained with adequate air ventilation and circulation for a minimum of 24 hours (48 hours for Ameristone, TerraNeo and Limestone) thereafter, or until the products are completely dry. Refer to published product data sheets for more specific information.
- .2 Existing Conditions: The contractor shall have access to electric power, clean water and a clean work area at the location where the Dryvit materials are to be applied.

1.9 Sequencing and Scheduling

- .1 Installation of the Outsulation PD System shall be coordinated with other construction trades.
- .2 Sufficient manpower and equipment shall be employed to ensure a continuous operation, free of cold joints, scaffold lines, texture variations, etc.

1.10 Limited Time Warranties

- .1 Dryvit Systems Canada shall provide a written moisture drainage and limited materials warranty against defective material upon written request. Dryvit shall make no other warranties, expressed or implied. Dryvit does not warrant workmanship. Dryvit Systems Canada standard ten (10) year limited warranty for all systems shall be provided for this project.
- .2 The applicator shall warrant workmanship separately. Dryvit shall not be responsible for workmanship associated with installation of the Outsulation PD System.

1.11 Design Responsibility

- .1 It is the responsibility of both the specifier and the purchaser to determine if a product is suitable for its intended use. The designer selected by the purchaser shall be responsible for all decisions pertaining to design, detail, structural capability, attachment details, shop drawings and the like. Dryvit has prepared guidelines in the form of specifications, installation details, and product sheets to facilitate the design process only. Dryvit is not liable for any errors or omissions in design, detail, structural capability, attachment details, shop drawings, or the like, whether based upon the information prepared by Dryvit or otherwise, or for any changes which purchasers, specifiers, designers, or their appointed representatives may make to Dryvit's published comments.

1.12 Maintenance

- .1 Maintenance and repair shall follow the procedures noted in the Dryvit Outsulation PD System Application Instructions, DSC602.
- .2 All Dryvit products are designed to minimize maintenance. However, as with all building products, depending on location, some cleaning may be required. See Dryvit publication DSC152 on Cleaning and Recoating.
- .3 Sealants and flashings should be inspected on a regular basis and repairs made as necessary.

PART 2 PRODUCTS

2.1 Manufacturer

- .1 All components of the Outsulation PD System shall be supplied or obtained from Dryvit or its authorized distributors. Substitutions or additions of materials other than specified will not be accepted. The "System" is to be considered proprietary and is to be installed by one trade responsible for acceptance of the substrate and all EIFS related components which make up the DRYVIT System PD.

2.2 Materials

- .1 Portland Cement: Shall be Type 10, meeting ASTM C 150, white or gray in color, fresh and free of lumps.
- .2 Water: Shall be clean and free of foreign matter.

2.3 Components

- .1 Air/Water Resistive Barrier Components: Used as a secondary barrier over sheathing type substrates and may be utilized as part of an air barrier system.
 - .1 Noncementitious air /moisture and vapour barrier
 - .1 Backstop NT-VB: a factory mixed, fully formulated water-based material for use over approved substrates where a vapour barrier material is desired. Use over uneven and porous masonry type substrates will require leveling using Genesis (wet) prior to application

- .2 Noncementitious air and moisture barrier (vapour permeable)
 - .1 Backstop™ NT: a factory mixed, fully formulated water-based material for use over all sheathing types. May be used over masonry type substrates following leveling coat of Genesis (wet).
 - .3 Cementitious: A liquid polymer based admixture field mixed with equal parts Type 10 Portland cement
 - .1 Dryflex: May be used over gypsum and cement based sheathings as well as masonry and concrete where desired.
 - .4 Dryvit Grid Tape™: An open weave fiberglass mesh tape with pressure sensitive adhesive available in rolls 102 mm (4 in) wide by 91 m (100 yds) long. For Backstop NT and VB, AquaFlash Mesh may be used on flat joints.
- .2 Flashing Materials: Used to protect substrate edges at terminations.
 - .1 Liquid Applied: An extremely flexible water-based polymer material, ready for use.
 - .1 Shall be AquaFlash and AquaFlash Mesh
 - .2 Sheet Type:
 - .1 Shall be Flashing Tape and Surface Conditioner
 - .1 Dryvit Flashing Tape™: A high density, polyethylene film backed with a rubberized asphalt adhesive available in rolls 102 mm (4 in), 152 mm (6 in) and 229 mm (9 in) wide by 23 m (75 ft) long..
 - .2 Dryvit Flashing Tape Surface Conditioner™: A water-based surface conditioner and adhesion promoter for the Dryvit Flashing Tape.
- .3 Adhesives: Used to adhere the EPS to the air/water-resistive barrier, shall be compatible with the water-resistive barrier and the EPS.
 - .1 Cementitious: A liquid polymer-based material, which is field mixed with Portland cement.
 - .1 Shall be Primus or Genesis
 - .2 Factory Blended: A dry blend cementitious, copolymer-based product, field mixed with water.
 - .1 Shall be Primus DM, Genesis DM, Genesis DMS, Rapidry DM™ 35-50 or Rapidry DM 50-75
- .4 Insulation Board: Expanded Polystyrene meeting Dryvit Specification for Insulation Board, DSC131
 - .1 Thickness of insulation board shall be minimum 51 mm (2 in).
 - .2 Dryvit Geometrically Defined Insulation Board™ has a 15 mm-chamfer cut around the entire perimeter of the board along with three 25-mm wide by 10mm deep grooves that are spaced at 305 mm centre-to-centre, between which are four inverted triangular grooves measuring 38 mm at their base

- and narrowing to 2 mm at the peak. The base of the triangle aligns with the perimeter chamfer at a depth of 15 mm.
- .3 The insulation board shall be manufactured by a board supplier listed by Dryvit Systems Canada.
 - .5 Insulation Board Closure Blocks: Expanded Polystyrene meeting Dryvit Specification for Insulation Board, DSC131. The Closure Blocks shall measure a minimum of 152 mm (6 in) in height.
 - .6 Dryvit Starter Strip
 - .1 A 51 mm x 152 mm x 1.2 m (2 in x 6 in x 4 ft) piece of aged expanded polystyrene configured to receive the Dryvit AquaDuct. It is required at the base of all walls, at base of horizontal terminations, and heads of windows and other openings.
 - .7 Dryvit AquaDuct:
 - .1 Located on top of the Dryvit Starter Strip within the "V" shaped chamfer and fabricated in-situ using Dryvit AquaFlash[®] and AquaFlash Mesh.
 - .8 Base Coat: Shall be compatible with the EPS insulation board and reinforcing mesh(es).
 - .1 Cementitious: A liquid polymer-based material, which is field mixed with Portland cement.
 - .1 Shall be Primus or Genesis.
 - .2 Noncementitious: A factory-mixed, fully formulated, water-based product.
 - .1 Shall be NCB™ (for use in combustible construction only).
 - .3 Factory Blended: A dry blend cementitious, copolymer-based product, field mixed with water.
 - .1 Shall be Primus DM, Genesis DM, Genesis DMS, Rapidry DM 35-50 or Rapidry DM 50-75.
 4. Noncombustible material as per CAN/ULC-S114: For use with Outsulation PD NC
 - .1 Shall be Primus DM.
 - .9 Reinforcing Mesh: A balanced, open weave, glass fiber fabric treated for compatibility with other system materials. **NOTE: Reinforcing meshes are classified by impact resistance and specified by weight and tensile strength as listed in Section 1.04.D.1.d.**
 - .1 Shall be Intermediate, Panzer 15, Panzer 20, Detail and Corner Mesh.
 - .1 At minimum Intermediate mesh shall be used over the entire wall area in accordance with Outsulation PD Application instructions. Minimum mesh/mesh overlap shall be 75mm (3.0 in).
 - .10 Finish: Shall be the type, color and texture as selected by the architect/owner and shall be one or more of the following:
 1. E: Water-based, lightweight acrylic coating with integral color and texture, and formulated with DPR chemistry:

- .1 Quarzputz E
- .2 Sandpebble E
- .3 Sandpebble Fine E
- 2. Coatings, Primers and Sealers:
 - .1 Demandit™
 - .2 Weatherlastic Smooth
 - .3 Tuscan Glaze™
 - .4 Revyvit™
 - .5 Color Prime™
 - .6 Prymit™
 - .7 SealClear™

PART III EXECUTION

3.1 Examination

- .1 Prior to installation of the Otsulation PD System, the contractor shall verify that the substrate:
 - .1 Is of a type listed in Section 1.04.C.1.
 - .2 Is flat within 6.4 mm (1/4 in) in a 1.2 m (4 ft) radius.
 - .3 Is sound, dry, connections are tight; has no surface voids, projections, or other conditions that may interfere with the Otsulation PD System installation or performance.
- .2 Prior to installation of the Otsulation PD System, the general contractor shall insure that all needed flashings and other waterproofing details have been completed, if such completion is required prior to the Otsulation PD application. Additionally, the contractor shall ensure that:
 - .1 Metal roof flashing has been installed in accordance with Asphalt Roofing Manufacturers Association (ARMA) Standards,
 - .2 Openings are flashed in accordance with the Otsulation PD System Installation Details, DSC603, or as otherwise necessary to prevent water penetration.
 - .3 Windows, Doors, etc. are installed and flashed per manufacturer's requirements and the Otsulation PD System Installation Details, DSC603.
- .3 Prior to the installation of the Otsulation PD System, the contractor shall notify the general contractor, and/or architect, and/or owner of all discrepancies.

3.2 Preparation

- .1 The Otsulation PD materials shall be protected by permanent or temporary means from inclement weather and other sources of damage prior to, during, and following application until completely dry.
- .2 Protect adjoining work and property during Otsulation PD installation.

- .3 The substrate shall be prepared as to be free of foreign materials, such as oil, dust, dirt, form-release agents, efflorescence, paint, wax, water repellants, moisture, frost, and any other condition that may inhibit adhesion.

3.3 Installation

- .1 The system shall be installed in accordance with the Dryvit Outsulation PD System Application Instructions, DSC602.
- .2 The overall minimum base coat thickness shall be sufficient to fully embed the mesh. The recommended method is to apply the base coat in two (2) passes.
- .3 Sealant shall not be applied directly to textured finishes or base coat surfaces. Dryvit Outsulation PD System surfaces in contact with sealant shall be coated with Demandit or Color Prime.
- .4 High impact meshes shall be installed as specified at ground level, high traffic areas and other areas exposed to or susceptible to impact damage.

3.4 Field Quality Control

- .1 The contractor shall be responsible for the proper application of the Outsulation PD materials.
- .2 Arrange for on-site inspections by a recognized third party inspector as selected by the owner.
- .3 The contractor shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures, workmanship and as to the specific products used.
- .4 The EPS supplier shall certify in writing that the EPS meets Dryvit's specifications.
- .5 The sealant contractor shall certify in writing that the sealant application is in accordance with the sealant manufacturer's and Dryvit's recommendations.

3.5 Cleaning

- .1 All excess Outsulation PD System materials shall be removed from the job site by the contractor in accordance with contract provisions and as required by applicable law.
- .2 All surrounding areas, where the Dryvit Outsulation PD System has been applied, shall be left free of debris and foreign substances resulting from the contractor's work.

3.6 Protection

- .1 The Outsulation PD System shall be protected from inclement weather and other sources of damage until dry and permanent protection in the form of flashings, sealants, etc. are installed.

3.7 Colour Schedule

- .1 Colour to match existing EIFS in adjacent building areas.

The Meridian
Community Building Rebuild

EIFS/ Proprietary Systems
Dryvit Systems Canada
Outsulation PD System
Issued for Tender

Section 07 24 00

Page 18
March 2019

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Supply and install Tyvek Homewrap weather barrier to all exterior areas as per manufacturer's specifications, to ensure continuous membrane from top of foundation to underside of roof framing.
- .2 All through wall flashings to run under "Tyvek", joint to be taped.
- .3 Install "Tyvek" as per manufacturer's specifications.
- .4 Provide & install Blueskin SA at perimeter of all exterior wall penetrations (windows, doors, etc.) and as underlayment for sheet metal flashings and aluminum window sills. Tie in with drip cap at door & window heads as per typical details.
- .5 Call for Architect inspection prior to concealing weather barrier. Work covered up without inspection shall be fully exposed & repaired at no additional cost to owner.

1.2 SUBMITTALS

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

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Applicator: company specializing in performing work of this section with minimum five years documented experience with installation of air/vapour barrier systems.
 - .1 Completed installation must be approved by the material manufacturer.
 - .2 Applicator: company:
 - .1 Currently licensed by National Air Barrier Association.
 - .2 Must maintain their license throughout the duration of the project.
- .2 Mock-Up:
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct typical exterior wall panel, 3 m long by 3 m wide, incorporating window, insulation, building corner condition, junction with roof system thru wall flashing and masonry wall tie; illustrating materials interface and seals.
 - .3 Locate where directed.

- .4 Mock-up may not remain as part of finished work.
- .5 Allow 24 hours for inspection of mock-up by Consultant before proceeding with weather barrier Work.

- .3 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
 - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

1.4 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 SEQUENCING

- .1 Sequence work to permit installation of materials in conjunction with related materials and seals.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

- .1 Air Barrier Membrane: Reinforced SBS Modified Bitumen self-adhesive composite membrane, nom. 1.5mm thick or rubberized asphalt self-adhesive composite membrane nom. 1 mm thick.
 - .1 Acceptable products: Blueskin SA by Bakor, Perm-A-Barrier by W.R. Grace, Sopraseal Stick 1100 by Soprema, ExoAir 110 by Tremco.
 - .2 Acceptable product (no primer required): 3M Air and Vapour Barrier 3015.
- .2 Thru-Wall Flashing Membrane: Reinforced SBS Modified Bitumen self-adhesive composite membrane, laminated to a cross-laminate, high-density polyethylene film with a siliconized release liner. nom. 1.0mm thick
 - .1 Acceptable products: Blueskin TWF by Bakor, Perm-A-Barrier Wall Flashing by W.R. Grace, Sopraseal WFM by Soprema, ExoAir TWF by Tremco.
 - .2 Acceptable product (no primer required): 3M Air and Vapour Barrier 3015TWF – detail Thru-wall flashing membrane.

- .3 Primer:
 - .1 Manufacturers listed under 2.1.1.1: Synthetic rubber primer and one-part thermoplastic rubber based sealant for Self-Adhesive membrane as recommended by manufacturer of membrane.
 - .2 Manufacturer listed under 2.1.1.2: Primer for difficult substrates: Test adhesion before application. Select from the following products:
 - 1) 3M™ Hi-Strength 90 Spray Adhesive
 - 2) 3M™ Hi-Strength 94 ET Spray Adhesive
 - 3) 3M™ Scotch-Weld™ Holdfast 70
 - 4) 3M™ Fastbond™ Contact Adhesive 30NF
 - .3 VOC limits as per Section 01 61 00 Product Requirements
- .4 Adhesive: compatible with sheet seal membrane and substrate, permanently non-curing. VOC limits as per Section 01 61 00 Product Requirements
- .5 Sealant around Penetrations: Butyl Sealant or trowel applied liquid air/vapour barrier membrane synthetic, rubber based adhesive compatible with sheet seal membrane and substrate, permanently non-curing.
 - .1 Sealants as per 07 92 00 Joint Sealants.
- .6 Metal flashing supports: 26 GA (0.55mm) zinc coated steel commercial quality to ASTM A526M with Z275 designated zinc coating.
- .7 Provide the above materials in either summer grade (above 5 degrees C) or winter grade (between -5 to 5 degrees C) applications to suit installation temperatures.
- .8 Weather Barrier:
 - .1 Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® HomeWrap® and related assembly components.
 - 2. Performance Characteristics:
 - 1. Air Penetration: <.004 cfm/ft² at 1.57 psf, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
 - 2. Water Vapor Transmission: 56 perms, when tested in accordance with ASTM E96-05, Method A.
 - 3. Water Penetration Resistance: 250 cm when tested in

accordance with AATCC Test Method 127.

4. Basis Weight: 1.8 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 5. Air Resistance: 1200 seconds, when tested in accordance with TAPPI Test Method T-460.
 6. Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882.
 7. Tear Resistance: 8/6 lbs, when tested in accordance with ASTM D1117.
 8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 15, Smoke Developed: 15
- .3 Accessories:
1. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape as distributed by DuPont Building Innovations.
 2. Fasteners:
 1. DuPont™ Tyvek® Wrap Caps, as distributed by DuPont: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
 2. Masonry tap-con fasteners with DuPont™ Tyvek® Wrap Caps as distributed by DuPont: 2-inch diameter plastic cap fastener.
 3. Sealants
 1. Refer to Section 07 92 00 Joint Sealants.
 4. Adhesive:
 1. Provide adhesive recommended by weather barrier manufacturer.
 2. Products:
 - a. Liquid Nails® LN-109
 - b. Denso Butyl Liquid
 - c. 3M High Strength 90
 - d. SIA 655
 - e. Adhesives recommend by the weather barrier manufacturer.
 5. Primer:
 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 2. Products:
 - a. 3M High Strength 90
 - b. Denso Butyl Spray
 - c. SIA 655

- d. Permagrip 105
- e ITW TACC Sta' Put SPH
- f. Primers recommended by the flashing manufacturer

6. Flashing

1. DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
2. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

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.

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 weather barrier manufacturer's requirements.
- .3 Report unsatisfactory conditions to Consultant in writing.
- .4 Do not start work until deficiencies have been corrected.
 - .1 Beginning of Work implies acceptance of conditions.

3.4 INSTALLATION

- .1 Install materials in accordance with manufacturer's instructions.

3.5 THRU-WALL

- .1 Install materials in accordance with manufacturer's instructions.

FLASHING

- .2 Install flashings over openings in exterior walls.
- .3 Install flashings in masonry in accordance with CAN3-A371-M84 and as specified herein.
- .4 Install flashings under exterior masonry and siding resting on foundation walls, curbs, slabs, shelf angles, and steel angles over openings.
- .5 Install flashings under weep hole courses and as indicated.
- .6 Where required in double wythe masonry walls, veneered walls, and siding clad walls carry flashings from front edge of masonry or siding under outer wythe, then up backing not less than 200mm, bond to backing using manufacturer's recommended adhesive.
- .7 Where required and detailed provide metal flashing support to adhere thru wall flashing to and span over gaps and voids larger than 50mm.
- .8 Lap joints 150mm and seal full overlap with adhesive.
- .9 Turn up ends of flashings at ends to form end dams (ie. at sills of openings/windows).
- .10 Install over horizontal firestops at drainage courses.
- .11 Install flashings in other locations indicated.

3.7 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 as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation,

remove surplus materials, excess materials, rubbish, tools and equipment.

3.9 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

- .1 Reference Standards: CAN/CGSB-51.34M86, vapour barrier polyethylene sheet for use in building construction..
- .2 Vapour Barrier Material: CAN/CGSB-51.34, .6 mil thick.
- .3 Jointing Tape: Waterproof adhesive recommended by vapour barrier manufacturer for joining polyethylene sheet.
- .4 Install vapour barriers to protect the entire wall and ceiling surface ensuring that no openings or punctures remain.
- .5 Use manufactured vapour barrier boxes for all electrical outlets. staple and tape all sides. (coordinate with Electrical plan)
- .6 Consultant to inspect work prior to covering up vapour barrier. Work covered up without inspection shall be fully exposed and repaired at no additional cost to Owner.
- .7 Caulk all joints in vapour barriers continuously for the full length of each joint. All joints shall fall on truss/joists/studs or be packed to allow joint to be clamped closed by drywall and backing.**
- .8 Where a vapour barrier is punctured, apply a patch with a minimum of 10" coverage in any direction. Tape continuously around the perimeter of each patch.
- .9 Double-up vapour barriers at all inside corners and extend legs for minimum 4" in each direction and continuously tape joints.
- .10 Return vapour barrier into rough stud opening at windows and doors. Overlap corners and seal with sealant or tape. Spray low expansion polyurethane foam insulation at perimeter of opening, between frame and vapour barrier. Ensure continuous seal.
- .11 Caulk stud plate to joist header and sub-floor.
- .12 Run caulking at all framing joints prior to installing vapour barrier.

- .1 Do asphalt shingle work to C.S.A. A123.51-M85.
 - .1 Type: strip self-seal.
 - .2 Mass: minimum 250 lbs/square for type.
 - .3 EcoLogo certified.
 - .4 Colours: as selected by Consultant.
 - .5 Texture: as selected by Consultant.
 - .6 Acceptable material: Landmark Pro Series by Certain Teed Corporation or Timberline HD Shingles by Gaf Materials Corporation. Include all system components to comply with warranty requirements.
- .2 Accessories: starter, hip and ridge shingles to match colour selections.
- .3 Roofing Felt: to C.S.A. A123.30M1979 organic, felt no. 15, underlayment to O.B.C. 9.27.5, plastic cement to C.G.S.B. 37-GP-5Ma.
- .4 Ice and Water Shield by W. R. Grace Canada. Locations: 6'-0" up each side of roof valleys, Carry membrane 900mm past interior face of wall at all eaves and where noted on Roof Assemblies on drawing A4.01 .
- .5 Nails: to C.S.A. B111, Table 12, or galvanized steel, sufficient length to penetrate deck at least 3/4".
- .6 Install re-roofing at new roof junctions in accordance with CRCA & referenced standards. Ensure roof sheathing has been properly installed, is smooth & without sags prior to commencing work. Install ice & water-shield a minimum of 6'-0" wide at all valleys. Apply asphalt shingles in accordance with manufacturer's instructions. Do not use shingles which vary in colour or texture from the selected standard.
- .7 Complete installation should be of a consistent colour and texture throughout. Drip flashing and all courses should be straight and level, all corners neatly formed, with no ragged edges visible.

PART 1 - GENERAL

- 1.1 GENERAL REQUIREMENTS** .1 Conform to Sections of Division 1, as applicable.
- 1.2 DESCRIPTION** .1 Work includes supply and installation of vinyl siding and vinyl soffits complete with related components as specified herein and shown on the Drawings.
- .2 Supply and installation of pre-finished metal flashings by Section 07 62 00.
- .3 Supply and installation of wood strapping and related fasteners as grounds for anchorage of vinyl siding and vinyl soffit by Section 06 20 00, Finished Carpentry.
- 1.3 RELATED WORK** .1 Section 06 10 00 – Rough Carpentry
- .2 Section 06 20 00 – Finish Carpentry
- .3 Section 07 21 13 – Board Insulation
- .4 Section 07 21 16 – Blanket Insulation
- .5 Section 07 62 00 – Metal Flashing and Trims
- .6 Section 07 92 00 – Joint Sealants
- .7 Section 08 11 16 – Aluminum Doors and Frames
- .8 Section 08 90 00 – Louvers and Vents
- .9 Section 08 50 10 – Wood Windows
- .10 Mechanical drawings
- .11 Electrical drawings
- 1.4 REFERENCES** .1 ASTM International
- .1 ASTM D3679-17 Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding.
- .2 ASTM D4216-17 Specification for Rigid Poly(Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly(Vinyl Chloride) (CPVC) Building Products Compounds.
- .2 VSI The Vinyl Siding Institute Product Certification Program
- 1.5 ACTION AND INFORMATIONAL SUBMITTALS** .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
- .1 Submit manufacturer's written instructions outlining recommendations for periodic cleaning and maintenance of PVC trim, vinyl siding, vinyl soffits and related components. Include in Data Books.

- .3 Shop Drawings:
 - .1 Information on shop drawings to indicate:
 - .1 Installation instructions including all required accessories.
 - .4 Samples:
 - .1 Submit coloured samples of each type of vinyl siding and vinyl shakes for colour selection by Consultant. Complete freedom of choice shall be granted from manufacturers' complete range of colours.
- 1.6 CLOSEOUT SUBMITTALS
- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Submit maintenance data for installed products for incorporation into manual.
 - .3 Warranty Documentation: submit warranty documents.
- 1.7 QUALITY ASSURANCE
- .1 Qualifications:
 - .1 Manufacturer shall maintain rigorous production quality control standards to ensure that vinyl siding will perform as expected for its intended use.
 - .2 Use adequate numbers of skilled workmen who are thoroughly trained and experienced and who are completely familiar with the specified requirements and the methods needed for proper installation of the Work of this section. Workers shall have a minimum of five (5) years proven experience successfully completing similar installations.
- 1.7 DELIVERY, STORAGE AND HANDLING
- .1 Package and store products under cover in manufacturer's unopened packaging until ready for transport and installation. Refer to manufacturer's written instructions for specific storage and handling requirements.
 - .2 Deliver materials with labels and seals intact.
 - .3 Deliver materials in sufficient quantity to allow continuity of Work. Coordinate deliveries with Owner and Contractor.
 - .4 Upon receipt of materials, visually inspect for damage. Note any damage on receiving ticket and immediately report to shipping company and material manufacturer.
 - .5 Store materials in accordance with manufacturer's written instructions, off the ground and protected from the weather.

Prevent twisting, bending, or abrasion. Provide ventilation. Slope materials to ensure drainage.

- .6 Prevent contact with materials capable of causing discoloration or staining.
- .7 Materials that are damaged during delivery, storage or installation shall be rejected and replaced with new.

1.8 SITE CONDITIONS

- .1 Contractor shall be responsible for accuracy of all measurements, estimates of material quantities and sizes, and Site conditions that will affect Work.
- .2 Site verify dimensions prior to fabrication so that Work will be accurately designed, fabricated and fitted to structure.
- .3 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturers for optimum results. Do not install products under environmental conditions outside manufacturers' absolute limits.
- .4 Install materials outlined in this Section after Work by other Sections is complete and wall penetrations are watertight. Coordinate Work of this Section with installation of adjacent components and materials of other Sections. Ensure substrates are dry, clean, level, and plumb.

1.9 WARRANTY

- .1 Provide vinyl siding and soffit manufacturer's standard warranty naming Owner as beneficiary covering vinyl siding and related components against manufacturing defects which result in chipping, cracking, flaking, peeling, splitting, blistering and fading, and will resist denting due to its high impact resistance including hail damage for period of fifty (50) years from date Work is certified as being Substantially Performed. Warranty shall cover labour and materials and include repair or replacement at manufacturer's expense, to extent required, in event manufacturing defects which result in chipping, cracking, flaking, peeling, splitting, blistering and fading occurs or denting due to high impact resistance including hail damage occurs.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Vinyl Siding: ASTM D3679, poly-vinyl chloride panels with full-roll nailing hem, 3/4" (19 mm) lap height, wall thickness: 0.046" (1.17 mm), 2 - 4" (51-102 mm) exposure per panel, in longest lengths possible to minimize end joints, light roughsawn texture, solid colour throughout, low-gloss finish, colour from manufacturer's complete range of colours. Gentek Building

Products, Concord #64621 Double 5" Dutch, or equivalent.

- .2 Accessories: produced from same compound materials and with comparable properties as vinyl siding. Outside corner posts, inside corner posts, F channels, J channels, starter strips, undersill trim, drip caps, beltline trim, etc. as required for a complete installation. Match finish on adjacent vinyl siding.
- .3 Vinyl Soffit: ASTM D3679, poly-vinyl chloride panels with full-roll nailing hem, wall thickness: 0.044" (1.12 mm), 12" (305 mm) exposure per panel, in longest lengths possible to minimize end joints, solid colour throughout, low-gloss finish, colour from manufacturer's complete range of colours. Gentek Building Products, Sequoia Select Ultra-Premium Vinyl Soffit 64552 12" T-4 Soffit/Hidden Vent in vented locations and Sequoia Select Ultra-Premium Vinyl Soffit 64550 12" T-4 Solid Soffit in non-vented locations (refer to drawings), or equivalent.
- .4 Fasteners for Vinyl Siding: as recommended by vinyl siding manufacturer for securement to applicable substrates.

2.2 PERFORMANCE

1. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with latest edition of Ontario Building Code.
2. Accommodate:
 - (1) movement within system without causing damage to components;
 - (2) movement between system and perimeter components when subject to seasonal temperature cycling;
 - (3) dynamic loading and release of loads; and
 - (4) deflection of structural support framing.
3. Provide positive drainage to exterior for moisture entering or condensation occurring within siding systems.

PART 3 - EXECUTION

3.1 INSTALLERS

- .1 Use experienced and qualified technicians to carry out assembly and installation of siding and soffit components.

3.2 EXAMINATION

- .1 Examine substrates over which vinyl siding and soffits are to be installed and surrounding adjacent surfaces for conditions that would be detrimental to installation. Co-ordinate Work with related Sections to ensure proper dimensions and clearances

are maintained.

- .2 Ensure all penetrations through the facade are fitted with watertight sleeves. Verify pre-finished metal flashings are in place and lapped with building membranes as detailed. Co-ordinate with related Sections.
- .3 Advise Contractor of any conditions that would be detrimental to installation. Do not commence installation until unsatisfactory conditions have been corrected. Failure to report unsatisfactory conditions and/or commencement of installation shall be construed as acceptance of substrates.

3.3 INSTALLATION

- .1 Work of this Section shall be installed over clean dry substrates and in strict accordance with material manufacturers' written instructions.
- .2 Vinyl Siding and Soffits:
 - .1 Install vinyl siding and soffitss in accordance with best industry practices, with all joint members plumb and true.
 - .2 Exercise care when lifting siding and soffit panels into place to avoid damage to panel edges. Damaged panels shall be rejected and replaced at no cost to the Owner.
 - .3 Install expansion/control joints at building expansion/control joints and elsewhere, as indicated on the Drawings and as recommended by vinyl siding and soffit manufacturers.
 - .4 Do not install damaged, warped or misaligned material.
 - .5 Fasten vinyl siding/soffit material to structural supports; aligned, level, and plumb using methods and materials recommended by siding/soffit manufacturers for local wind load conditions. Locate joints over supports.
 - .6 Use concealed fasteners.
 - .7 Nail vinyl siding by placing nail in center of slot. Drive nails straight, leaving 1/16" (1.6 mm) space between nail head and flange of panel.
 - .8 Allow space between both ends of siding/soffit panels and trim for thermal movement.
 - .9 Overlap horizontal panel ends one-half the width of factory pre-cut notches.
 - .10 Stagger lap joints in siding/soffit in uniform pattern as successive courses of siding/soffit are installed.
 - .11 Where siding/soffit fit into accessories, allow room for expansion.
 - .12 Completed installation shall be properly secured, free of distortions, waviness, protrusions and damaged components.

3.4 CLOSE OUT

- .1 Inspect completed installation for flaws, defects or damage. Restore damaged trim, siding, soffits and accessory components so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the Consultant, remove and replace damaged components with new components at no cost to the Owner.
- .2 After installation is complete, clean trim, siding and soffits so they are free of foreign matter using cleaners recommended by material manufacturers. Leave finished Work in neat, clean condition.
- .3 Protect finished Work from damage by other trades.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 The work of this Section includes all, materials, tools and equipment, and labour required to supply and install complete roofing systems for the project as indicated on the drawings and noted below.
- .2 All products are to be single source for the roof system and compatible with the selected insulation to provide a complete "system" with a manufacturer warranty.
- .3 Conventional Roofing System over Wood roof Assembly.
 - .1 Cap Sheet: Modified Bituminous Cap Sheet Membrane - white
 - .2 Base Sheet: Modified Bituminous Base Sheet Membrane.
 - .3 Roof Sheathing board
 - .4 Type III Asphalt: In compliance with CSA A-123.4M.4M.
 - .7 Asphalt Primer: Manufacturer's asphalt primer
 - .8 Wood Roof Assembly including fibreglass batt insulation and poly air/vapour barrier.
- .4 The work of this section includes any membrane returns up and onto curbs, slabs, and piers as noted and detailed on the drawings.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 01 78 00 - Closeout Submittals.
- .5 Section 06 10 00 - Rough Carpentry
- .6 Section 07 13 00 – Waterproofing Membrane Systems
- .7 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .8 Section 07 92 00 - Joint Sealants.
- .9 Mechanical drawings: drains

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C 1177/C 1177M-01, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .2 ASTM D 41-94(2002)e1, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .3 ASTM D 312-00, Asphalt Used in Roofing.
 - .4 ASTM D 448-03, Standard Classification for Sizes of

- .5 Aggregate for Road and Bridge Construction.
- .5 ASTM D 2178-97a, Asphalt Glass Felt Used in Roofing and Waterproofing.
- .6 ASTM D 6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
- .7 ASTM D 6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
- .8 ASTM D 6164-00, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
 - .2 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .3 CGSB 37-GP-15M-84, Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .4 CGSB 37-GP-19M-85, Cement, Plastic, Cutback Tar.
 - .5 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
 - .6 CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .7 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

- .3 Canadian Roofing Contractors Association (CRCA).
 - .1 CRCA Roofing Specifications Manual-1997.

- .4 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-A123.3-98, Asphalt Saturated Organic Roofing Felt.
 - .2 CAN/CSA-A123.4-98, Asphalt for Use in Construction of Built-Up Roof Coverings and Waterproofing Systems.
 - .3 CSA A231.1-99, Precast Concrete Paving Slabs.
 - .4 CSA O121-M1978(R1998), Douglas Fir Plywood.
 - .5 CSA O151-M1978(R1998), Canadian Softwood Plywood.

- .5 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).

- .6 Factory Mutual (FM Global).
 - .1 FM Approvals - Roofing Products.

- .7 Health Canada / Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .8 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .9 Underwriters Laboratories' of Canada (ULC).
 - .1 CAN/ULC-S701-01, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S704-2001, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .3 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.4 PERFORMANCE REQUIREMENTS

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

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets.
- .4 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Indicate flashing, control joints, tapered insulation details.
- .6 Provide layout for tapered insulation.
- .7 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .8 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .9 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.
- .10 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

1.6 QUALITY
ASSURANCE

- .1 Submit laboratory test reports in accordance with Section 01 45 00 - Quality Control.
- .2 Submit laboratory test reports certifying compliance of bitumens and membrane with specification requirements.
- .3 Convene pre-installation meeting one week prior to beginning waterproofing 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.
- .4 Contractors must be members in good standing of the Ontario or Canadian Roofing Contractor's Association (ORCA or CRCA) and/or have been established as a roofing contractor for a minimum of 5 years, and shall be recognized as a qualified SBS Modified Bitumen Membrane installer.
- .5 Roofing work shall be performed only by experienced and qualified applicators in accordance with Manufacturer's recommendations and best trade practices. Replace all work that results from inferior products or workmanship as directed by the Consultant.
- .6 Installer qualifications: Engage an experienced installer to perform work of this section who is specialized in installing roofing similar to that required for this project, who is approved, authorized or licensed by the roofing system manufacturer to install the manufacturer's product and who is eligible to receive the standard roofing manufacturer's warranty.
- .7 The roofing contractor and his subcontractors, throughout the bid and installation periods, must own a business license and must be officially recognized as an approved contractor by the roofing product manufacturer. Only skilled tradespersons, officially employed by a roofing contractor operating adequate and necessary equipment, will be authorized to perform all roofing work.
- .8 Employ only skilled tradesmen who have successfully completed a course of instruction provided by the material manufacturer and are experienced in this work.
- .9 Upon request by the Consultant, submit evidence of previously

completed projects of a similar nature.

1.7 FIELD QUALITY CONTROL

- .1 The Owner may appoint an independent Waterproofing/Roofing inspector to conduct inspections and tests to ensure compliance with specification requirements. The cost of the inspection and testing shall be paid by the Owner.
- .2 Provide a minimum two working days notice to the Consultant and Roofing Inspector of commencement of each phase of the work and provide them with manufacturer's literature on materials and installation upon request.
- .3 On completion of the roofing, conduct in the presence of and under the direction of the Roofing Inspector, a flood test of that portion of the work.
- .4 After installation, provide certification, signed by the roofing material manufacturer, that all items have been installed in accordance with the shop drawings and the manufacturer's specifications and details.
- .5 Cooperate with the Roofing Inspector and Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to and during their use and during the warranty period.

1.8 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.9 STORAGE AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.
- .2 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.
- .3 Remove only in quantities required for same day use.
- .4 Place plywood runways over completed Work to enable movement of material and other traffic.
- .5 Store sealants at +5 degrees C minimum.
- .6 Store insulation protected from daylight and weather and deleterious materials.

- .7 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.
- .8 All materials will be delivered and stored in conformance with the requirements described in the manufacturer's product manual; they must remain in their original packaging with manufacturer's name and product standards.

1.10 PROTECTION

- .1 Fire Extinguishers: maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle, ULC labeled for A, B and C class protection. Size 9 kg on roof per torch applicator, within 6 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel Metal and Plastic waste in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with CEPA , TDGA , Regional and Municipal regulations.
- .7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
- .8 Ensure emptied containers are sealed and stored safely.
- .9 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.
- .10 Unused adhesive, sealant and asphalt materials must not be

disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

- .11 Dispose of unused adhesive material at official hazardous material collections site approved by Consultant.
- .12 Dispose of unused sealant material at official hazardous material collections site approved by Consultant.
- .13 Dispose of unused asphalt material at official hazardous material collections site approved by Consultant.
- .14 Divert unused gypsum materials from landfill to recycling facility as reviewed by Consultant.
- .15 Fold up metal banding, flatten and place in designated area for recycling.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -5 degrees C to manufacturers' recommendations for mop application.
- .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .3 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.
- .4 Conduct moisture tests of concrete slabs prior to application to confirm subsurface is acceptable to membrane manufacturer.

1.13 WARRANTY

- .1 Provide manufacturer's warranty stating that the membrane and membrane flashing will remain in a watertight condition and will not leak as a result of faulty materials for a period of 10 years from the date of substantial performance of the contract. The scope of the warranty shall include all material and labour to return the membrane to a weathertight condition.
- .2 Contractor hereby warrants that modified bituminous roofing and membrane flashings will stay in place and remain leak proof in accordance with General Conditions but for two years from the date of substantial performance of the contract. Make all necessary repairs and replacements within 48 hours of receipt of written notification.

PART 2 - PRODUCTS

- 2.1 DECK PRIMER .1 Asphalt primer: to CGSB 37-GP-9Ma ASTM D 41.
.1 Apply to all plywood, glass mat gypsum board and concrete surfaces to receive vapour barrier at a rate of approximately 0.16L/sq.m.
.2 Acceptable Products: Elastacol Stick by Soprema or 910-01 by Bakor.
- 2.2 VAPOUR BARRIER .1 As detailed on the drawings.
- 2.3 MEMBRANE .1 Base sheet: to CGSB 37-GP-56M polyester fibres to ASTM D 6164 glass fibres to ASTM D 6163 combination of polyester and glass fibres to ASTM D 6162.
.1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, glass or polyester reinforcement, having nominal weight of 180 g/m².
.2 Type 2, fully adhered.
.3 Class C - plain surfaced.
.4 Grade heavy duty service.
.5 Top and bottom surfaces:
.1 Sanded/sanded sanded/polyethylene.
.6 Base sheet membrane properties: to CGSB 37-GP-56M.
.1 Strain energy (longitudinal/transversal): 11/10.6 kN/m.
.2 Breaking strength (longitudinal/transversal): 17.0/18.0 N/5 cm.
.3 Ultimate elongation (longitudinal/transversal): 60/60 %.
.4 Tear resistance: 85 N.
.5 Cold bending at -30 degrees C : no cracking.
.6 Softening point: \leq 110 degrees C.
.7 Static puncture resistance: >380.
.8 Dimensional Stability: -0.3 / 0.3 %.
.7 ULC certification: Class A.
.8 Acceptable Products: SOPRALENE FLAM 180 by SOPREMA.
- .2 Cap sheet membrane: to CGSB 37-GP-56M polyester fibres to ASTM D 6164 glass fibres to ASTM D 6163 combination of polyester and glass fibres to ASTM 6162.
.1 Styrene-Butadiene-Styrene(SBS) elastomeric polymer, prefabricated sheet, glass or polyester reinforcement, having

- nominal weight of 250 g/m².
- .2 Type 1, fully adhered.
 - .3 Class A-granule surfaced.
 - .1 Colour for granular surface: white with an SRI of at least 86.
 - .4 Grade heavy duty service.
 - .5 Bottom surface polyethylene.
 - .6 Cap sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): 11.9/9.5 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 19.5/15.1 kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): 61/75 %.
 - .4 Tear resistance: 70 N.
 - .5 Cold bending at -30 degrees C: No cracking.
 - .6 Softening point: ≥ 110 degrees C.
 - .7 Static puncture resistance: 470 N.
 - .8 Dimensional Stability: -0.2 / 0.1 %.
 - .9 Lap joint strength (kN/m)Pass >4
 - .7 ULC certification: Class A.
 - .8 Acceptable Products: SOPRASTAR FLAM HD GR by SOPREMA

2.4 BITUMEN

- .1 Asphalt: to CAN/CSA A123.4 ASTM D 312, Type 2

2.5 INSULATION

- .1 Roof Insulation: Fibreglass Batt Insulation for placement within the wood truss space is specified in Section 07 21 16.
- .2 Tapered Insulation: Polyisocyanurate Insulation Boards, tapered to provide drainage slopes around roof elements and where sloped roof trusses do not direct water to drains.

2.6 SEALERS

- .1 Plastic cement: asphalt, to CAN/CGSB-37.5.
- .2 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.
- .3 Sealants: Caulking - see Section 07 92 00 - Joint Sealants.

2.7 CARPENTRY

- .1 Refer to Section 06 10 00 - Rough Carpentry.

2.8 CANT STRIPS

- .1 Cut from pressure-treated wood 38 mm thick or prefabricated fibreboard material, to measure 140 mm on slope.

2.9 FASTENERS

- .1 Covering to wood deck: No. 10 flat head, self tapping, Type A or AB, cadmium plated screws.
- .2 Insulation to deck: coated insulation fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance, as recommended by insulation manufacturer.

2.10 EXPANSION JOINTS

- .1 Joint expansion out of elastomer, with the monolithic details vulcanized in factory, without seam nor splice joint with horizontal movement of +/- 50mm, vertical movement of +/- 20mm, and shear movement of +/- 20mm: Product FLamLine 40 Touch Grade Waterproofing Expansion Joint by Situra Inc.

2.11 ACCESSORIES

- .1 Vent stack flashings: purpose made spun aluminium, 1.6mm thick, 300mm high c/w integral deck flange and removable cap.
- .2 Sealing compound: Conform to CGSB 37-GP-29M.
- .3 "B" vent flashings: Thaler MEF-4A "B" vent flashings sized to suit vent diameter complete with integral deck flange and two piece collar.
- .4 Hot pipe flashings: Thaler MEF-3A hot pipe flashing sized to suit pipe diameter complete with integral deck flange and two piece friction fit collar.

2.12 BALLAST

- .1 Ballast reducing scrim (filter fabric): Ballast reducing scrim shall be woven polyolefin or polypropolyne fabric-resistant to water and ultra-violet degradation. Fabrene V.I.E. by Fabrene Inc. or Soprafiltre by Soprema.

2.13 WATERPROOFING
MASTICS

- .1 Waterproofing products: Mastic made of synthetic rubbers, plasticized with bitumen and solvents. Aluminium pigments are added to Mastic to provide greater resistance to U.-V. Specified product: SOPRAMASTIC ALU by SOPREMA.
- .2 Waterproofing products in conformance with CAN/CGSB-19.13-M87 – Sealing compound, one-component, elastomeric, chemical curing.
- .3 An aluminium coloured solvent-based mastic containing superior grade bitumen modified with SBS synthetic rubber and fibres. Designed for pitch box filling. Specified product:

MAMMOUTH PITCH POCKET FILLER by SOPREMA.

2.14 METAL FLASHINGS .1 As per Section 07 62 00

PART 3 - EXECUTION

- 3.1 WORKMANSHIP
- .1 Do roofing work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual and to FM ULC Design Standards, except where specified otherwise.
 - .2 Do priming for asphalt roofing in accordance with CGSB 37-GP-15M.
 - .3 The interface of the walls and roof wood deck assemblies shall be fitted with durable rigid material plywood providing connection point for continuity of air barrier.
 - .4 Assembly, component and material connections will be made in consideration of appropriate design loads.
 - .5 Prepare surfaces and complete Roofing work in conformance with Roofing Membrane Manufacturer's requirements, and the "Roofers' Guide".
 - .6 Install roofing elements on clean and dry surfaces, in conformance with manufacturer's instructions and recommendations.
 - .7 Roofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.
 - .8 Preferably seal all seams that are not covered by a cap sheet membrane in the same day. The cap sheet cannot be installed if any moisture is present at/in the base sheet seams.
 - .9 Whenever membranes are torch applied, a continuous and even bead of molten bitumen must be visible as the membrane is unrolled and torched.
 - .10 Roofing contractor responsible for installing parapet roof membranes over top of parapet curbs and down roof side of parapet.
- 3.2 EXAMINATION OF ROOF DECKS
- .1 Inspect with Consultant deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation

outlets to determine readiness to proceed.

- .2 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.
- .4 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood blocking) as well as upstands, parapets, and construction joints. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of roofing work will mean roofing conditions are acceptable for work completion.

3.3 PROTECTION

- .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 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage. Comply with precautions deemed necessary by Consultant.
- .6 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.
- .7 Metal connectors and decking will be treated with rust proofing or galvanization.

3.4 PRIMING

- .1 Apply deck primer to wood, concrete and gypsum board roofing substrate at the rate recommended by manufacturer.

3.5 VAPOUR BARRIER

- .1 Apply vapor barrier membrane as per manufacturer's instructions.

3.8 EXPOSED
MEMBRANE ROOFING
APPLICATION

- .1 Tapered insulation application:
 - .1 Install insulation as per manufacturer's instructions
 - .2 Install tapered insulation as first insulation layer, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.
- .3 Install roof cover board over roof insulation where re-cover board is not provided as part of insulation assembly to allow application of roof membrane base sheet.
- .4 Base sheet application:
 - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
 - .2 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², at 230 degrees C.
 - .3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fishmouths.
- .5 Cap sheet application:
 - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
 - .3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
 - .4 Application to be free of blisters, fishmouths and wrinkles.
 - .5 Do membrane application in accordance with manufacturer's recommendations.
 - .6 Apply reflective coating to roof surface area in accordance with manufacturers recommendations.
- .6 Flashings:
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.
 - .3 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
 - .4 Provide 75 mm minimum side lap and seal.
 - .5 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.

- .6 Do work in accordance with manufacturer's recommendations Section 07 62 00 - Sheet Metal Flashing and Trim.
- .7 Roof penetrations:
 - .1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.
- .8 Expansion Joints:
 - .1 Install expansion joint as per manufacturer's instructions and directions and details.
 - .2 Ensure expansion joint is clean and free of debris and packed with compressible semi-rigid insulation of backer rod of appropriate size. Align the center line of expansion joint gag with the centre line of the expansion joint material.
 - .3 Apply heat to the waterproofing ply and embed the FlamLINE into it, using the torch and flop technique. Press FlamLINE into the hot waterproofing with a blunt putty knife.
 - .4 Flash in the FlamLINE with compatible torch down flashing ply, encapsulating the expansion joint membrane. After installation provide mechanical protection for the expansion joint with metal flashing as detailed

- 3.9 CANTS
 - .1 Install mineral wool fibre cants over roof sheathing.
 - .2 Apply hot bitumen to receiving surface and embed cant firmly by hand. Fasten wood cants to wood insulation stops.
 - .3 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90 degrees.

- 3.10 WALKWAYS
 - .1 Walkways at exposed membrane roof systems (R4 Assembly) to consist of one additional ply of cap sheet membrane. Colour to be different from field membrane as selected by Consultant.

- 3.11 FIELD QUALITY CONTROL
 - .1 Inspection and testing of membrane application may be carried out by testing laboratory designated by Owner.
 - .2 Costs of tests will be paid under cash allowance by Owner.

- 3.12 FLOOD TESTING
 - .1 Do not conceal waterproofing until inspection and testing are completed and approved by Consultant.
 - .2 Temporarily plug drains and dam horizontal surface areas to

be tested and flood with water to minimum depth of 80 mm.

- .3 Maintain flooded depth for 24 hours.
- .4 If leaks occur repair and retest.
- .5 Remove water at end of test.

3.13 CLEANING

- .1 Clean Work in accordance with Section 01 74 11 - Cleaning.
- .2 Clean to Consultant's approval, soiled surfaces, spatters, and damage caused by Work of this Section.
- .3 Check area drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.
- .4 Remove bituminous markings from finished surfaces.
- .5 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .6 Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 06 10 00 - Rough Carpentry
	.2	Section 07 27 00 – Air Barriers
	.3	Section 07 52 00 - Modified Bituminous Membrane Roofing and Waterproofing
<u>1.2 REFERENCES</u>	.1	American Society for Testing and Materials (ASTM International)
	.3	Canadian Roofing Contractors Association (CRCA)
	.1	Roofing Specifications Manual 1997.
	.4	Canadian General Standards Board (CGSB)
	.1	CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
	.2	CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
	.3	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 B111-1974(R2003), Wire Nails, Spikes and Staples.
<u>1.3 SAMPLES</u>	.1	Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.
<u>1.4 WASTE MANAGEMENT AND DISPOSAL</u>	.1	Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
	.2	Remove from site and dispose of all packaging materials at appropriate recycling facilities.
	.3	Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
	.4	Place materials defined as hazardous or toxic in designated containers.
	.5	Ensure emptied containers are sealed and stored safely for disposal away from children.
	.6	Divert unused metal materials from landfill to metal recycling

facility as approved by Consultant.

- .7 Unused paint and sealant material must be disposed of at an official hazardous material collections site as approved by Consultant.
- .8 Unused paint and sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .9 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- .1 Zinc coated steel sheet: 26 GA, 0.457mm thickness, commercial quality to ASTM A 653/A 653M, with Z275 designation zinc coating.

2.2 METAL FINISHES

- .1 Prefinished steel with factory applied silicone modified polyester.
 - .1 Class F1S.
 - .2 Colour as selected by architect. Allow for three colours
 - .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D 523.
 - .4 Coating thickness: not less than 20 micrometres.
 - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D 822 as follows:
 - .1 Outdoor exposure period 1000 hours.
 - .2 Humidity resistance exposure period 1000 hours.

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: self adhesive membrane composed of SBS modified bitumen and a polyethylene woven complex c/w primer.
 - .1 Acceptable products: Sopraseal stick 1100 by Soprema or Blueskin SA by Bakor.
 - .2 Thru-wall flashing membranes: Blueskin TWF by Bakor, Perm-A-Barrier wall flashing by W.R. Grace, or Sopraseal WFM by Soprema
- .4 Sealants: as per Section 07 92 00.
- .5 Cleats: of same material, and temper as sheet metal, minimum

50 mm wide. Thickness same as sheet metal being secured.

- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details and as indicated.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form Parapet cap flashings, copings, and fascias to profiles indicated of 26 ga, prefinished sheet metal.
- .2 Form metal flashing trims to metal siding with 26 ga. Prefinished sheet metal, finish to match siding.
- .3 Form roof terrace metal flashings at back side of parapets and scuppers to profiles indicated of 26 ga. prefinished sheet metal.

2.6 REGLETS AND CAP FLASHINGS

- .1 Form recessed reglets sheet metal to be built-in concrete masonry work for base flashings as detailed in accordance with CRCA FL series details, . Provide slotted fixing holes and steel/plastic washer fasteners. Cover face and ends with plastic tape.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details, and as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Insert metal flashing into reglets and under cap flashing to form weather tight junction.
- .8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .9 Caulk flashing at reglet and cap flashing with sealant.
- .10 Install scupper as indicated.

3.2 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

1. General

1.1 RELATED REQUIREMENTS

- .1 Section 05 00 00 - Metal Fabrication.
- .2 Section 06 10 00 Rough Carpentry.
- .3 Section 07 27 00 Air Barriers.
- .4 Section 07 52 00 Modified Bituminous Membrane Roofing
- .5 Section 07 62 00 Sheet Metal Flashing and Trim
- .6 Section 07 92 00 Joint Sealants
- .7 Section 09 91 13 Exterior Painting

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A 653/A 653M-03, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM D 2369-03, Test Method for Volatile Content of Coatings.
 - .3 ASTM D 2832-92(R1999), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
 - .4 ASTM D 5116-97, Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.105-M91, Quick-Drying Primer.
- .3 Canadian Standards Association (CSA International).
 - .1 CSA B111-1974(R2005), Wire Nails, Spikes and Staples.

1.3 DESCRIPTION

- .1 Design Requirements:
 - .1 Roof hatches to withstand snow load and wind uplift loads as indicated on structural drawing and temperature range of 100 (-40 to 60) degrees C without damage to unit or permanent deformation to seals.

1.4 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 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate size and description of components, materials, attachment devices, description of frame and finish, and construction details.
 - .3 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for hardware complete with pertinent details, spare parts lists and warnings against harmful maintenance materials and practices for incorporation into manual specified in 01 78 00 - Closeout Submittals.
- .2 Roof hatch manufacturer shall provide the manufacturer's Warranty prior to the contract closeout.

1.7 PRODUCT HANDLING

- .1 All materials shall be delivered in manufacturer's original packaging.
- .2 Store materials in a dry, protected, well-vented area. The contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.8 JOB CONDITIONS

- .1 Verify that other trades with related work are complete before installing roof hatch.
- .2 Mounting surfaces shall be straight and secure; substrates shall be of proper width.
- .3 Refer to the construction documents, shop drawings, and manufacturer's installation instructions.

- .4 Coordinate installation with roof membrane and roof insulation manufacturer's instructions before starting.
- .5 Observe all appropriate OSHA safety guidelines for this work.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management And Disposal.
- .2 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Consultant.
- .4 Divert unused caulking, sealants, and adhesive materials from landfill to official hazardous material collections site approved by Consultant.
- .5 Do not dispose of unused caulking, sealants, and adhesive materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

1.10 WARRANTY/GUARANTEEE

- .1 Manufacturer's standard warranty: Materials shall be free of defects in material and workmanship for a period of ten years from the date of substantial performance. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.
- .2 Manufacturer's Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

2 Products

2.1 MATERIALS

- .1 Steel sheet: regular quality alloy steel to ASTM A 506.
- .2 Galvanized steel sheet: commercial quality to ASTM A 653, Z275 designation zinc coating.
- .3 Gaskets: heavy extruded EPPM for continuous seal to top of curb.
- .4 Fasteners: screws to manufacturer's standard.
- .5 Sealants: Refer to Section 07 92 00 – Joint Sealing and VOC limit for joint sealants as per 01 61 00.
- .6 Prime paint for steel: to CAN/CGSB-1.105.

.7 Isolation coating: alkali resistant bituminous paint or epoxy solution.

2.2 MANUFACTURER

.1 The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-203-934-6363, Fax: 1-203-933-8478, Web: www.bilcouk.com

2.3 HATCH COVER

- .1 Furnish and install where indicated on plans metal roof hatch Type S-50T, size width: 762mm x length: 915mm. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
- .2 Performance characteristics:
1. Cover shall be reinforced to support a maximum live load of 195 kg/m^2 with a maximum deflection of 1/150th of the span or 97 kg/m^2 wind uplift.
 2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 3. Operation of the cover shall not be affected by temperature.
 4. Entire hatch shall be weathertight with fully welded corner joints on cover and curb.
- .3 Cover: Shall be 2.3mm aluminum with a 100mm beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to ensure a continuous seal when compressed to the top surface of the curb.
- .4 Cover insulation: Shall be polyisocyanurate of 75mm thickness with a min. R-value of 20. Insulation shall be fully covered and protected by an aluminum liner.
- .5 Curb: Shall be 305mm in height and of 2.3mm aluminum. The curb shall be formed with a 114mm flange with 11mm holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip[®] flashing system, including stamped tabs, 153mm on center, to be bent inward to hold single ply roofing membrane securely in place.
- .6 Curb insulation: Shall be polyisocyanurate of 75mm thickness with a min. R-value of 20.
- .7 Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe that is through bolted to the curb assembly.
- .8 Hardware
1. Heavy duty pintle hinges with 9mm Type 316 stainless steel hinge pins shall be provided
 2. Cover shall be equipped with a spring latch with interior and exterior turn handles
 3. Roof hatch shall be equipped with interior and exterior padlock hasps.
 4. The latch strike shall be a stamped component bolted to the curb assembly.
 5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with

- a 25mm diameter red vinyl grip handle to permit easy release for closing.
6. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.
 7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- .9 Finishes: Factory finish shall be mill finish aluminium.

2.4 FABRICATION

- .1 Fabricate components free of twists, bends, or visual distortion and insulated. Weld corners and joints.
- .2 Assemble roof hatch components as indicated.
- .3 Ensure continuity of weather-tight seal.
- .4 Design flashings to collect and lead off accumulated condensation.
- .5 Zinc plate hardware and attachments and shop prime ready for field painting.

2.5 ENVIRONMENTAL REQUIREMENTS

- .1 Provide adhesives, sealants, and sealant primers with VOC quantities lower than stated in SCAQMD Rule #1168, current edition.
- .2 Provide primers, paints, sealers, coatings and wood finishes with VOC quantities lower than limits stated in Green Seal's Standards GS-3 and GS-11 and SCAQMD Rule #1113, current editions.

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 Erect components plumb, level and in proper alignment.
- .2 Ensure continuity of building envelope air barrier and vapour retarder systems.
- .3 Adjust and seal assembly with provision for expansion and contraction of components.
- .4 Secure prefabricated curb assembly to structure.

- .5 Coat aluminum and copper in contact with dissimilar materials, with isolation coating.
- .6 Secure and seal frame to curb.

3.3 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 The work of this Section includes all material, equipment, tools, and labour required to supply and install fire stopping materials to maintain noted fire separations.
- .2 Fire stopping of mechanical and electrical service penetrations are the responsibility of the mechanical and electrical trades. Mechanical, plumbing, fire protection, and electrical shall each be responsible for fire stopping their service penetrations. Refer to mechanical and electrical specifications for additional requirements.

1.2 RELATED SECTIONS

- .1 Section 03 45 00 – Architectural Precast Concrete
- .2 Section 06 10 00 – Rough Carpentry
- .3 Section 07 21 13 - Board Insulation
- .4 Section 07 21 16 - Blanket Insulation
- .5 Section 07 92 00 - Joint Sealants
- .6 Section 09 21 16 - Gypsum Board Assemblies
- .7 Mechanical drawings
- .8 Electrical drawings

1.3 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Test Requirements: CAN/ULC-S115-11, "Standard Method of Fire Tests of Through Penetration Fire Stops".
- .3 Underwriters Laboratories of Canada (ULC) of Scarborough runs CAN/ULC-S115-11 under their designation of ULC-S115-11 and publishes the results in their "FIRE RESISTANCE RATINGS DIRECTORY" that is updated annually.
- .4 Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually. UL tests that meet the requirements of ULC-S115-M are given a cUL listing and are published by UL in their "Products Certified for Canada (cUL) Directory. Omega Point Laboratories runs ASTM E-814 and publishes the results annually in their "Omega Point Laboratories Directory"
- .5 Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems". These test requirements provide more guidelines for testing moving joints than that given in CAN4-S115-M. UL tests that meet the requirements of

ULC-S115-M are given a cUL listing and are published by UL in their "Products Certified for Canada (cUL) Directory

- .6 Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops."
- .7 Test Requirements: ASTM E 2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus"
- .8 International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- .9 CAN/ULC-S102-M, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .10 ASTM D6904, "Standard Practice for Resistance to Wind Driven Rain for Exterior Coatings Applied on Masonry"
- .11 ASTM C 679, "Standard Test Method for Tack-Free Time of Elastomeric Sealants"
- .12 All major building codes: NBC, OBC
- .13 NFPA 101 - Life Safety Code
- .14 Canadian Electrical Code

1.4 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. Fire stop material also refers to assemblies intended to close off openings and gaps in the floor slabs and between wall assemblies and the edges of floor slabs to maintain fire separations between floor levels.
- .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.
 - .1 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.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.
- .3 Shop Drawings:
 - .1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.
 - .2 Construction details should accurately reflect actual job conditions.
- .4 Samples:
 - .1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.
- .5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
 - .2 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
 - .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.
 - .5 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD

QUALITY CONTROL.

- .6 Manufacturer's engineering judgment identification number and drawing details when no ULC or cUL system is available for an application. Engineered judgment must include both project name and contractor's name who will install firestop system as described in drawing.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company specializing in fire stopping installations with 5 years documented experience approved by manufacturer. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary training to install manufacture's products per specified requirements.
 - .2 A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.
 - .3 The work is to be installed by a contractor with at least one of the following qualifications:
 - FM 4991 Approved Contractor
 - UL Approved Contractor
 - Product Manufacturer's Accredited Fire Stop Specialty Contractor
- .2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .3 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
 - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

- .4 Firestop System installations must meet requirements of CAN/ULC-S115-11 or UL 2079 tested assemblies that provide a fire rating as shown in Section 2.03 Clauses 18, 19 & 20 below.
- .5 Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- .6 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council
- 1.7 DELIVERY, STORAGE AND HANDLING
- .1 Packing, shipping, handling and unloading:
- .1 Deliver, store and handle materials in accordance w.th Section 01 61 00 - Common Product Requirements
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC or cUL markings.
- .2 Storage and Protection:
- .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Replace defective, damaged or expired materials with new.
- .3 Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- .3 Waste Management and Disposal:
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- PART 2 - PRODUCTS
- 2.1 PERFORMANCE REQUIREMENTS
- .1 Provide firestopping composed of components that are compatible with each other, the substrates forming openings,

and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

- .2 Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- .3 Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.
- .4 Provide a round fire-rated cable management device whenever cables penetrate fire rated walls, where frequent cable changes and additions may occur. The fire-rated cable management device shall consist of a corrugated steel tube with zinc coating, contain an inner plastic housing, intumescent material rings, and inner fabric smoke seal membrane. The length of the sleeve shall be 315mm. The fire-rated cable management device shall contain integrated intumescent firestop wrap strip materials sufficient to maintain the hourly rating of the barrier being penetrated. The fire-rated cable management device shall contain a smoke seal fabric membrane or intumescent firestop plugs sufficient to achieve the L-Rating requirements of the barrier type. Install device per the manufacturer’s published installation instructions.
- .5 Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11
 - .1 F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.
- .6 Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11.
 - .1 F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - .2 T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
- .7 Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E

- 814.
- .1 L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.
 - .8 Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G21.
 - .9 Rain and water resistance: provide perimeter joint sealant tested in accordance with ASTM D 6904 with less than 1 hour tack free time as tested in accordance with ASTM C 679.
 - .10 Fire-resistance rating of installed fire stopping assembly in accordance with NBC and OBC.
 - .11 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
 - .12 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
 - .13 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.
 - .14 Sealants for vertical joints: non-sagging.

2.2 MATERIALS

- .1 Subject to compliance with through penetration firestop systems and joint systems listed in the U.L.C Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory
- .2 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- .3 For penetrations through a Fire Separation wall provide a firestop system with a "F" Rating as determined by ULC or cUL as indicated below:

Fire Resistance Rating of Separation	Required ULC or cUL "F" Rating of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

For combustible pipe penetrations through a Fire Separation provide

a firestop system with a "F" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

- .4 For penetrations through a Fire Wall or horizontal Fire Separation provide a firestop system with a "FT" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.
- .5 Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

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.
 - .1 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 Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
 - .1 Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 - .2 Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - .3 Protect materials from damage on surfaces subjected

to traffic.

- .3 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .4 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .5 Tool or trowel exposed surfaces to neat finish.
- .6 Remove excess compound promptly as work progresses and upon completion.
- .7 Regulatory Requirements: Install firestop materials in accordance with ULC Fire Resistance Directory or UL Products Certified for Canada (cUL) Directory or Omega Point Laboratories Directory.

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 Mechanical pipe insulation: certified fire stop system component.
 - .1 Ensure pipe insulation installation precedes fire stopping.

3.5 FIELD QUALITY CONTROL

- .1 Inspections: notify Authority Having Jurisdiction and 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 as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.7 SCHEDULE

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Edge of floor slabs at curtain wall and window wall assemblies by-passing edge of floor slab.
 - .3 Top of fire-resistance rated masonry and gypsum board partitions.
 - .4 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .7 Openings and sleeves installed for future use through fire separations.
 - .8 Around mechanical and electrical assemblies penetrating fire separations.
 - .9 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 The work of this Section includes all, materials, tools and equipment, and labour required to supply and install joint sealants for the project as indicated on the drawings and noted below.
- .2 Requirements for Joint Sealants to complete other various Sections containing sealant or caulking specifications.

1.2 RELATED SECTIONS

- .1 Section 04 05 00 - Common Work Results for Masonry
- .2 Section 07 27 00 - Air Barriers
- .3 Section 07 52 00 - Modified Bituminous Membrane Roofing
- .4 Section 07 62 00 - Sheet Metal Flashing and Trim
- .5 Section 08 11 00 - Metal Doors and Frames
- .6 Section 08 11 16 - Aluminum Doors and Frames
- .7 Section 08 50 00 - Windows
- .8 Section 08 80 50 - Glazing
- .9 Section 08 90 00 - Louvres and Vents
- .10 Section 09 21 16 - Gypsum Board Assemblies

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 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 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 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.

- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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.
- .3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit duplicate samples of each type of material and colour.
- .5 Cured samples of exposed sealants for each color where required to match adjacent material.
- .6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Instructions to include installation instructions for each product used.
- .7 Submit MSDS with VOC contents

1.5 QUALITY ASSURANCE/MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up to show location, size, shape and depth of joint s complete with back-up material, primer, caulking and sealant.
- .3 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Locate where directed.
- .5 Allow 24 hours for inspection of mock-up by Consultant before proceeding with sealant work.

- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.
- 1.7 WASTE MANAGEMENT AND DISPOSAL
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .6 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Consultant.
- .8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .9 Fold up metal banding, flatten, and place in designated area for recycling.
- 1.8 PROJECT CONDITIONS
- .1 Environmental Limitations:
.1 Do not proceed with installation of joint sealants under following conditions:
.1 When ambient and substrate temperature

conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work by use of approved portable supply and exhaust fans.

1.10 WARRANTY

.1 Contractor hereby warrants that joint sealants will stay in place and remain leak proof in accordance with General Conditions (GC), but for five years from the date of substantial performance of the contract. Make all necessary repairs and replacements within 48 hours of receipt of written notification.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

.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.

- .4 VOC limit for joint sealants as per 01 61 00.
 - .1 Substrate metal to metal sealant 30g/l
 - .2 Substrate plastic foam sealant 50g/l
 - .3 Substrate porous material sealant 50g/l
 - .4 Substrate wood sealant 30g/l
 - .5 Substrate fibreglass sealant 80g/l
 - .6 Architectural sealant 250g/l
 - .7 other 420g/l
- .5 VOC limit for sealant primers as per 01 61 00.
 - .1 Architectural nonporous 250g/l
 - .2 Architectural porous 775g/l
 - .3 other 750g/l
- .6 All sealants and primers shall comply with SCAQMD 1168, aerosol adhesives to comply with Green Seal Standard for Commercial adhesives.

2.2 SEALANT
MATERIAL
DESIGNATIONS

- .1 Type 1: Urethanes Two Part.
 - .1 Non-Sag to CAN/CGSB-19.24, Type 2, Class B, colour selected by consultant from full product range.
 - .2 Acceptable material:Tremco Dymeric 240FC
- .2 Type 2: Urethanes One Part.
 - .1 Self-Leveling to CAN/CGSB-19.13, MG-2-25-B-N, colour selected by consultant from full product range
 - .2 Acceptable material : Tremco Dymonic 100
- .3 Type 3: Silicones One Part.
 - .1 To CAN/CGSB-19.13, Type MCG-2-25-A-L.
 - .2 Acceptable material: Spectrum 2 by Tremco
- .4 Type 4: Silicone Resistant One Part Mildew resistant:
 - .1 Acceptable material:Tremsil 200 by Tremco
- .5 Type 5: Acrylic Latex One Part.
 - .1 To CAN/CGSB-19.17.
 - .2 Acceptable material:Tremflex 834 by Tremco
- .6 Type 6: Acoustical Sealant.
 - .1 To ASTM C 919.
 - .2 Acceptable material: Acoustical Sealant by Tremco
- .7 Type 7: Urethanes One or Two Part
 - .1 Multi or single component, self levelling or slope grade polyurethane sealant to ASTM C 920, Type M, Grade P, Class 25, Use T,M,A and O
 - .2 Acceptable material: THC 900 or THC901 hybrid or

Vulkem 45 by Tremco

- .8 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded open closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
 - .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT
SELECTION

- .1 Use Sealant Type 1 or Type 3 at all locations except where another type is specified including: exterior joint work, bedding for windows, perimeter of all aluminum and steel entrance frames and windows including around base of all frames, below perimeter edge of door thresholds, perimeter of all louvers and exhaust caps, balcony floor slabs and poured concrete curbs.
- .2 Use Sealant Type 1 or Type 3 at Expansion and control joints in exterior surfaces of poured-in-place concrete walls, and at exterior side of cold joint at balcony concrete curbs.
- .3 Use Sealant Type 1 or Type 3 at Expansion and control joints in exterior surfaces of precast panels.
- .4 Use Sealant Type 1 or Type 3 at Control and expansion joints in exterior surfaces of unit masonry walls.
- .5 Use Sealant Type 3 at glass to glass, glass to metal and metal to metal joints, including coping joints and coping-to facade joints:
- .6 Use Sealant Type 7 at exterior joints in horizontal wearing surfaces, and penetrations through floors.
- .7 Use Sealant type 2 or Type 3 at all interior perimeters of exterior openings as detailed on drawings. Use at interior joints between windows, door frames and screen frames and adjacent wall assemblies.
- .8 Use Sealant Type 2 or Type 3 at all control and expansion joints on the interior of exterior poured-in place concrete walls.

- .9 Use Sealant Type 2 or Type 3 at control and expansion joints on the interior of exterior surfaces of unit masonry walls.
- .10 Use Sealant Type 7 at Interior control and expansion joints in floor surfaces, sawcuts and perimeter joints in floor slabs..
- .11 Use Sealant Type 2 or Type 3 at perimeters of interior frames and penetrations through interior walls.
- .12 Use Sealant Type 2 or Type 3 at interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls).
- .13 Use Sealant Type 6 at joints at tops of non-load bearing, non-rated masonry walls at the underside of poured concrete.
- .14 Use Sealant type 4 at perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, water closets, basins, access doors, vanities, and countertops).
- .15 Use Sealant Type 5 at exposed interior control joints in drywall.
- .16 Use Sealant Type 6 at Perimeter of all acoustically rated partitions and around penetrations through acoustically rated partitions.

2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .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 Ensure joint surfaces are dry and frost free.
 - .5 Prepare surfaces in accordance with manufacturer's directions.
- 3.3 TESTING
- .1 Perform an adhesive test of proposed joint sealant for all exterior applications to confirm surface prep, priming and sealant performance to manufacturer's specifications. Submit written test results to Consultant prior to proceeding with project work.
- 3.4 PRIMING
- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
 - .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.
- 3.5 BACKUP MATERIAL
- .1 Apply bond breaker tape where required to manufacturer's instructions.
 - .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.
- 3.6 MIXING
- .1 Mix materials in strict accordance with sealant manufacturer's instructions.
- 3.7 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 primer to joints prior to caulking application.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .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 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION

GENERAL NOTES

- .1 All metal doors and frames for painting
- .2 Door sizes shown are frame rebate sizes
- .3 Glass for hollow metal screens shall be the same as doors within the screen as noted.
- .4 All hollow metal frames in masonry or concrete walls shall be filled with grout.
- .5 Where doors are fire-rated or ULC labelled, door frames and hardware shall match.
- .6 Provide sealant around all hollow metal frames, both sides.
- .7 Provide door caps across head of exterior, stair and security doors.
- .8 Undercut doors to janitor closets and electrical rooms.
- .10 Indicated size of glass units in doors shall be exposed glass area, inside glazing stop to inside glazing stop.
- .11 All exterior hollow metal doors shall be insulated units. Refer to specification section 08 11 00.
- .12 Throat dimensions noted in schedule are equal to the overall wall thickness for-wrap around frames.
- .13 Refer to Drawing A9.01 for the Door Schedule, including Door Styles and Door Jamb details.

GLASS TYPES – see Specification 08 80 00

- GL-1 Double Glazed Insulating Glass Units (all exterior doors – tempered where noted on Door Styles.
- GL-2 Clear Tempered (interior doors)
- GL-3 Clear Wired Glass (all fire-rated glazing).
- GL-4 Solar Reflective Glass (Low emissivity (LOW E) glass)

PART 1 - GENERAL

**1.1 RELATED
SECTIONS**

- .1 Section 04 05 00 - Common Work Results for Masonry
- .2 Section 07 92 00 - Joint Sealants
- .3 Section 08 14 16 - Flush Wood Doors
- .4 Section 08 71 00 - Door Hardware
- .5 Section 08 80 50 - Glazing
- .6 Section 08 90 00 - Louvres and Vents
- .7 Section 09 91 13 - Exterior Painting
- .8 Section 09 91 23 - Interior Painting

1.2 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 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 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .3 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.
 - .4 CAN4-S105-M85, Standard Specification for Fire Door

Frames Meeting the Performance Required by CAN4-S104.

1.3 SYSTEM
DESCRIPTION

- .1 Design Requirements:
 - .1 Design exterior frame assembly to accommodate 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 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
 - .4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E 152 or NFPA 252 and listed by nationally recognized agency having factory inspection services.

1.4 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 shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .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.

1.5 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition

Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
 - .1 Recycled Content: 30 % post-consumer content, 0 % pre-consumer content.
- .2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.
 - .1 Recycled Content: 30 % post-consumer content, 0 % pre-consumer content.

2.2 DOOR CORE MATERIALS

- .1 Stiffened: face sheets, insulated core.
 - .1 Recycled Content: 15 % post-consumer content, 0 % pre-consumer content.
 - .2 Fibreglass: to CAN/ULC-S702, semi-rigid Type 1 density 24 kg/m³.
 - .3 Polyurethane: to CAN/ULC-S704 rigid, modified poly/isocyanurate, closed cell board. Density 32 kg/m³.
- .2 Honeycomb construction: Structural small cell 24.5mm maximum kraft paper 'honeycomb'. Weight: 36.3 kg per ream minimum. Density 16.5 kg/m³ minimum sanded to required thickness.

2.3 ADHESIVES

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.
 - .1 Maximum VOC limit 50 g/L to GC-03.

2.5 PAINT

- .1 Field paint steel doors and frames in accordance with Sections 09 91 23 - Interior Painting, 09 91 13 - Exterior Painting. Protect weatherstrips from paint. Provide final finish free of

scratches or other blemishes.

.1 Maximum VOC emission level 50 g/L to GS-11.

2.6 ACCESSORIES

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior top and bottom caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Door bottom seal: Refer to Hardware Schedule.
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal riveted.
- .7 Sealant: Refer to Section 07 92 00.
 - .1 Maximum VOC limit 250 g/L.
- .8 Glazing: Refer to Door Schedule and Section 08 80 50
- .9 Make provisions for glazing as indicated and provide necessary glazing stops.
 - .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws.
 - .2 Design exterior glazing stops to be tamperproof.

2.7 FRAMES FABRICATION GENERAL

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 1.6 mm welded type construction.
- .4 Interior frames: 1.6 mm welded type construction.
- .5 Blank, reinforce, drill and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head

for double door.

- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.

2.8 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 jamb and intermediate at 660 mm on centre maximum.

2.9 FRAMES: WELDED TYPE

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.10 DOOR FABRICATION GENERAL

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.

- .2 Exterior doors: Polyurethane insulated hollow steel stiffened construction.
- .3 Interior doors: Honeycomb construction.
- .4 Fabricate doors with longitudinal edges locked seam fill with metallic paste filler and sand to a uniform smooth finish.
- .5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.
- .6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 Reinforce doors where required, for surface mounted hardware. Provide flush PVC top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in conformance with CAN4-S104 ASTM E 152 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.
- .9 Manufacturer's nameplates on doors are not permitted.
- .10 Ensure door sizes are fabricated so bottoms clear floor finish but do not exceed ULC Standards. Coordinate with finished floor materials listed in Division 09 and Room Finish Schedule.

2.11 HOLLOW STEEL
CONSTRUCTION

- .1 Form face sheets for exterior doors from 1.6 mm (16ga) sheet steel.
- .2 Form face sheets for interior doors from 1.25 mm (18ga) sheet steel.
- .3 Reinforce exterior doors with vertical stiffeners, securely welded to face sheets at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with polyurethane core.

- .5 Interior doors fabricated with honeycomb cores laminated under pressure to face sheets.

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. Frame installation tolerances to comply with Canadian Steel Door manufacturer's Association Standard as indicated on Drawings 08 11 00-1, 2, 3 & 4 included as part of this section.
- .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: 3.3 mm.
 - .2 Latchside and head: 3.3 mm.
 - .3 Finished floor, and thresholds: 19 mm.

Door clearance tolerances to comply with Canadian Steel Door manufacturer's Association Standard as indicated on Drawings 08 11 00-1, 2, 3 & 4 included as part of this section.

- .3 Adjust operable parts for correct function.
- .4 Install louvres.

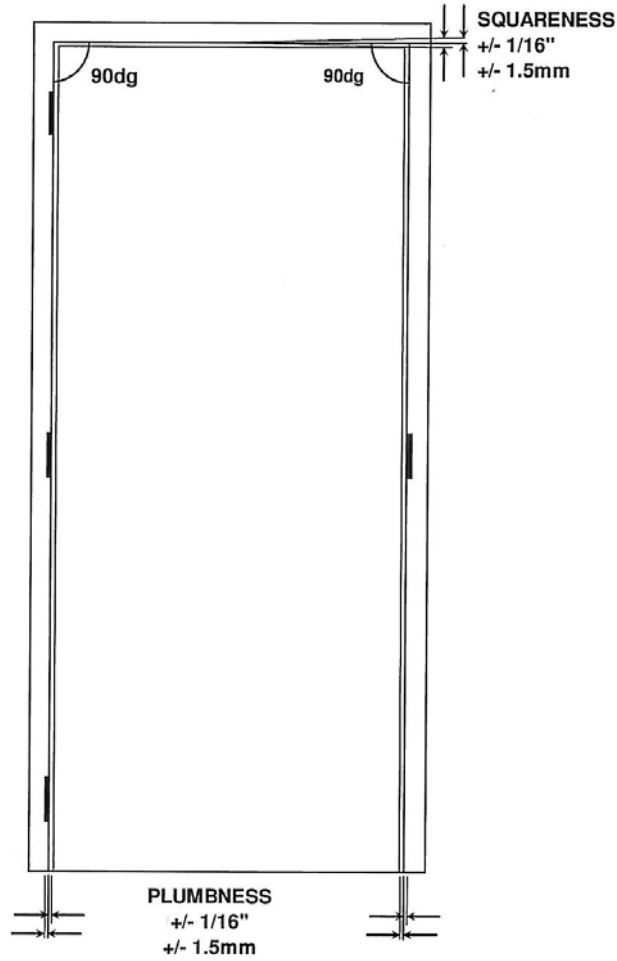
3.5 FINISH REPAIRS

- .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.

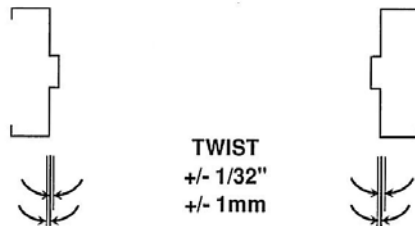
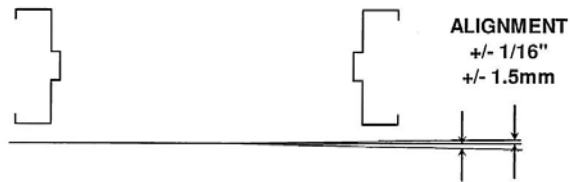
3.6 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing and Door Schedule.

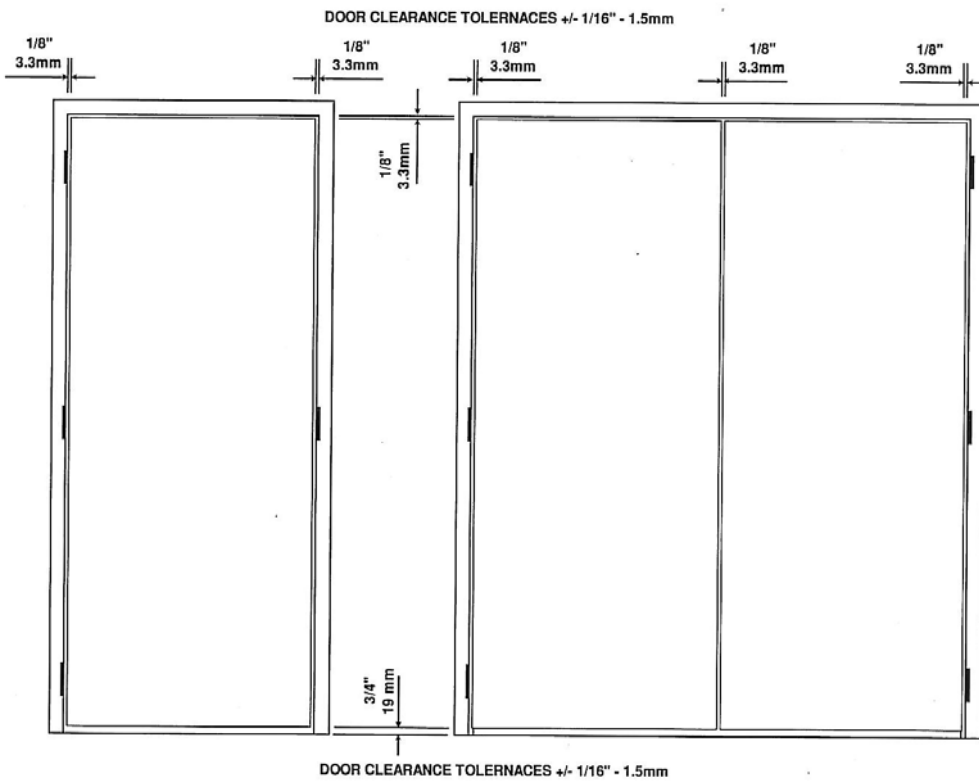
END OF SECTION



NOTE: The accumulative effect of installations with tolerances at their maximum will result in sufficient misalignment to prevent the door and/or hardware from functioning properly. Installers are cautioned not to create tolerance build up. Reference: NFPA 80-Standard for Fire Doors and Windows



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PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 05 50 00 - Metal Fabrications.
- .2 Section 06 10 00 - Rough Carpentry.
- .3 Section 07 27 00 - Air Barriers
- .4 Section 07 92 00 - Joint Sealing.
- .5 Section 08 50 00 - Windows
- .7 Section 08 71 00 - Door Hardware - General.
- .8 Section 08 80 50 - Glazing
- .9 Electrical Drawings – connections for security systems and sensors, outlet boxes, conduit boxes and fittings

1.2 REFERENCES

- .1 Aluminum Association (AA).
 - .1 DAF 45-03, Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA 609/610-09, Cleaning and Maintenance of Architectural Anodized Aluminum.
- .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .4 Canadian General Standards Board (CGSB).
 - .1 CGSB 1.40-97, Primer, Structural Steel, Oil Alkyd Type.
 - .2 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
 - .3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
- .5 Canadian Standards Association (CSA International).
 - .1 CAN/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.

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 75 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 Accommodate movement within system.
- .4 Accommodate movement between system and perimeter framing components or substrate.

- .2 Size glass thickness and glass unit dimensions to limits in accordance with CAN/CGSB-12.20.
- .3 Design door system to provide average thermal resistance of:
 - .1 Door system (excluding vision glass areas): RSI of 3.8.
- .4 Provide continuous air barrier and vapour retarder through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheets in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 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.

1.5 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 each type of 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.
 - .7 Each type of door system including location.
 - .8 Arrangement of hardware and required clearances.
- .3 Submit catalogue details for each type of door and frame illustrating profiles, dimensions and methods of assembly.

1.6 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.7 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.

1.8 DELIVERY,
STORAGE, AND
HANDLING

- .1 Storage and Protection:
 - .1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.
 - .2 Leave protective covering in place until final cleaning of building.

1.9 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - 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.
- .4 Divert used metal cut-offs from landfill by disposal into the on-site metals recycling bin.

1.10 WARRANTY

- .1 The warranty period stated in General Conditions and relevant supplementary conditions is with respect to this section of work extended from one (1) year to three (3) years. Provide a written guarantee.
- .2 Warrant that aluminium finishes will not develop excessive fading, non-uniformity of colour and will not crack, peel, delaminate or otherwise corrode and that hardware fastening points will not wear excessively allowing hardware to work loose.
- .3 Warrant that stainless steel cladding will not crack, peel, delaminate from aluminium frames and doors.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Aluminum extrusions: Aluminum Association alloy AA 6063-T5 or T6 anodizing quality.
- .2 Sheet aluminum: Aluminum Association alloy AA 1100 - H14 or AA 5005 - H32 or H34 anodizing quality.
- .3 Steel reinforcement: to CAN/CSA-G40.20/G40.21, grade 300 W.
- .4 Fasteners: stainless steel, finished to match adjacent material.
- .5 Weatherstrip: replaceable mohair backed wool pile.
- .6 Door bumpers: black neoprene.
- .7 Door bottom seal: adjustable door seal of anodized extruded aluminum frame and vinyl weather seal, surface mounted with drip cap, closed ends,.
- .8 Isolation coating: alkali resistant bituminous paint.
- .9 Glazing materials: as per Section 08 80 50.
- .10 Sealants: as per Section 07 92 00 colour selected by Consultant.
- .11 Plastic shims: Glazelock Shims, High impact polystyrene horseshoe shaped purpose made glazing shims. (wood shims are NOT PERMITTED on this project.)
- .12 Aluminum cladding: Provide sample of corner closure pieces, caps, transom panels, louvers etc. for review and approval.

-
- 2.2 ALUMINUM SWING DOORS
- .1 Construct doors of porthole extrusions with minimum wall thickness of 2.4 mm.
 - .2 Door stiles nominal 127 mm wide plus or minus 6 mm.
 - .3 Top rail nominal 127 mm wide plus or minus 6 mm.
 - .4 Bottom rail nominal 165 mm wide plus or minus 6 mm.
 - .5 Mid rail nominal 127mm wide plus or minus 6mm.
 - .6 Reinforce mechanically-joined corners of doors to produce sturdy door unit.
 - .7 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.
 - .8 Provide thermally broken doors for exterior.
 - .9 Hardware:as per Hardware Schedule.
 - .10 Door swing: See Drawings.
 - .11 Acceptable Manufacturers:
 - .1 Kawneer
 - .2 Alumico
 - .3 Prevost
 - .4 Alumaticor
 - .5 Oldcastle
 - .6 Lessard
 - .7 AWD – Aluminum Window Design Installations Inc.
 - .8 Alternative Products not listed above which have been approved prior to tender closing.
- 2.3 EXTERIOR ALUMINUM FRAMES
- .1 Refer to drawings and door schedule for exterior framing elevations.
 - .2 Exterior non-cutainwall framing: storefront/entrance framing - aluminum extrusions with minimum wall thickness of 2mm.
 - .3 Frame members: 44 or 50mm x 115mm nominal size for flush glazing (centred).
 - .4 .Acceptable products:
 - .1 Kawneer Trifab VG 451UTAcceptable alternates (indicate applicable credit for selected alternate – subject to confirmation of ability to supply dual finish)
 - .2 Kawneer Trifab VG 451T

- .3 Alumico 600 or 3500 Series
- .4 Prevost 40 Series
- .5 Alumicor Flushglaze BF 3400.

- .5 Aluminum finishes:
 - .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
 - .1 White (exterior of frames).
 - .2 White (Interior of frames).
 - .2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1.

2.4 STEEL FINISHES

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

2.5 FABRICATION

- .1 Doors and framing to be by same manufacturer.
- .2 Fabricate doors and frames to profiles and minimum face sizes as shown. 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 - General.
- .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 operable parts for correct function.
- .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 Seal joints to provide weather tight seal at outside and air, vapour seal at inside.
- .2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within the aluminum work except where exposed use is permitted by Consultant.

3.5 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.
- .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 Schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
- .4 Obtain reports within three days of review and submit.

3.6 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.

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

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 00 – Rough Carpentry
- .2 Section 06 20 00 – Finished Carpentry
- .3 Section 08 11 00 – Metal Doors and Frames
- .4 Section 08 71 00 – Finished Hardware
- .5 Section 08 80 50 – Glazing
- .6 Section 09 91 23 – Interior Painting

1.2 REFERENCES

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
 - .1 Quality Standards for Architectural Woodwork 1998.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
 - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .3 Canadian Standards Association (CSA International).
 - .1 CSA O115-M1982(R2001), Hardwood and Decorative Plywood.
 - .3 CAN/CSA O132.2 Series-90(R1998), Wood Flush Doors.
 - .4 CAN/CSA-O132.5-M1992(R1998), Stile and Rail Wood Doors.
 - .5 CSA Certification Program for Windows and Doors 00.
- .4 Environmental Choice Program (ECP).
 - .1 CCD-045-92, Sealants and Caulking Compounds.
 - .2 CCD-046-92, Adhesives.
- .5 National Fire Protection Association (NFPA).
 - .1 NFPA 80-1999, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252-1999, Standard Method of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN-4S104M-80(R1985), Fire Tests of Door Assemblies.
 - .2 CAN4-S105M-85 (R1992), Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section

01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:

.1 For caulking materials during application and curing.

.2 For door materials and adhesives.

.2 Shop Drawings:

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

.2 Indicate door types and cutouts for lights and louvres, sizes, core construction, transom panel construction and cutouts.

1.4 SAMPLES

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

.2 Submit one 300 x 300 mm corner sample of each type wood door.

.3 Show door construction, core, glazing detail and faces.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Wood fire rated doors: labelled and listed by an organization accredited by Standards Council of Canada.

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Protection:

.1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.

- .2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.
- .3 Protect doors from scratches, handling marks and other damage.
- .4 Store doors away from direct sunlight.

**1.7 WASTE
MANAGEMENT AND
DISPOSAL**

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose of corrugated cardboard, polystyrene, plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused adhesive material from landfill to official hazardous material collections site.
- .5 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

1.8 WARRANTY

- .1 The warranty period stated in GC 12.3 Warranty and Relevant Supplementary Conditions, is, with respect to this section of work, extended from one year to three. Provide a written guarantee in the form specified in Section 01740.
- .2 Warranty shall specifically guarantee the wood doors against warpage, twist, showing core lines, splitting, delaminating and sag.

PART 2 - PRODUCTS

**2.1 FIRE RATED WOOD
DOORS**

- .1 Wood doors: tested in accordance with CAN4-S104 / NFPA 252 to achieve rating as scheduled.
 - .1 45 minute fire resistance rating.
 - .2 Construction: Fire rated construction to provide ULC or Warnock-Hershey labels.
 - .3 Internal blocking: AWMAC Option #3; Manufacturers' standard fire resistant blocking.
 - .4 Rails:
 - .1 Top: 20mm minimum
 - .2 Bottom: 70mm minimum (or as required for drop seals)

- .5 Stiles:
 - .1 Hinge: 19mm minimum.
 - .2 Lock: 19mm minimum.
 - .6 Crossbanding: 1.5mm thick HDF composite
 - .2 Face Panels: Flat Slab, Maple veneer.
 - .3 Acceptable Manufacturers:
 - .1 Cambridge Door Ltd
 - .2 Baillargeon Doors Inc.
 - .3 Lambton Doors,
 - .4 Madawaska Doors Inc
-
- 2.2 WOOD FLUSH DOORS
- .1 Solid core (Common Areas): to CAN/CSA-O132.2.1.
 - .1 Solid particleboard core: stile and rail frame bonded to particleboard core with wood lock blocks and special blocking adequate for fastening of hardware specified, 5-ply construction.
 - .2 Solid wood core:
 - .1 Glued block core with wood edge band.
 - .2 528 kg/m³ minimum, sanded faces, of thickness to fill void. Extruded particle board cores with voids are not permitted.
 - .3 Rails:
 - .1 Top 38mm minimum
 - .2 Bottom: 38mm minimum
 - .4 Stiles
 - .1 Hinge: 38mm minimum.
 - .2 Lock: 38mm minimum.
 - .3 Edge detail: AWMAC No. 2.
 - .5 5-ply construction.
 - .6 Crossbanding: 1.5mm thick HDF composite
 - .3 Face Panels:
 - .1 Hardwood; veneer grades: Grade: Custom, flat cut, Maple species. Paint finish.
 - .4 Adhesive: Type II (water resistant)] for interior doors.
 - .5 Acceptable Manufacturers:
 - .1 Cambridge Door Ltd
 - .2 Baillargeon Doors Inc.
 - .3 Lambton Doors,
 - .4 Madawaska Doors Inc.
-
- 2.3 GLAZING
- .1 Glass: As per Section 08 80 50 Glazing
-
- 2.4 FABRICATION
- .1 Vertical edge strips to match face veneer.

- .2 Prepare doors for glazing where indicated. Provide hardwood glazing stops with mitred corners.
- .3 Bevel vertical edges of single acting doors 3 mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.
- .4 Radius vertical edges of double acting doors to 60 mm radius.
- .5 Undercut doors where indicated.
- .6 Factory seal top and bottom of doors. Site apply sealer to edge of all cut-outs.
- .7 Finish wood veneer smooth and flush with stile edges of door and bevel at approximately 20 degrees.
- .8 Provide solid wood finish to match door face at all visible cut outs.
- .9 All doors to be factory premachined for specified finishing hardware.
- .10 Finish masonite facing snoot and flush with stile edges of door and bevel at approximately 20 degrees.
- .11 Provide sloped wood sill and door sweep at suite entrance doors. See drawings for sill profile, Refer to Section 06 20 00 Finished Carpentry

2.5 FINISHING

- .1 All wood doors to be shop finished, paint colour to be selected by Architect..

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 Unwrap and protect doors in accordance with CAN/CSA-O132.2 Series, Appendix A.
- .2 Install labelled fire rated doors to NFPA 80.
- .3 Install doors and hardware in accordance with manufacturer's printed instructions and CAN/CSA-O132.2 Series, Appendix A.

- .4 Adjust hardware for correct function.
- .5 Install glazing in accordance with Section 08 80 50 - Glazing.

3.3 ADJUSTMENT

- .1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

3.4 CLEANING

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

END OF SECTION

1 General

1.1 DESCRIPTION

- .1 This section specifies manually operated, top supported accordion-type folding partitions for wall to wall room division. Provide all labor, materials, tools, equipment and services required to comply with the provisions of contractual documentation

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 05 50 00 – Metal Fabrications - Steel Supporting Members or Hanger Rods.
- .4 Section 06 10 00 – Rough Carpentry - Wood Blocking, Rough Bucks, and Headers.
- .5 Section 06 20 00 – Finish Carpentry – Wood trim

1.3 QUALITY ASSURANCE

- .1 Manufacturer's Qualifications: Obtain products from single manufacturer who has provided units as specified for a minimum of three (3) years.
- .2 Installers Qualifications: Work is to be performed by installer having three (3) years' experience in work relating to this section and approved in writing by partition manufacturer.

1.4 PERFORMANCE REQUIREMENTS

- .1 The partitions are to provide a complete closure of opening when fully extended and latched.
- .2 Provide sound rated partitions with a sound transmission class (STC) of 45 or better when tested in accordance with ASTM E90. Noise insulation classification: ASTM E336, ASTM E413
- .3 Provide fabric and lining with flame spread rating of 25 or less, fuel contribution rating of 15 or less, and smoke generation of 50 or less when tested in accordance with ASTM E84. Complete assembly must also meet or surpass the requirements of NFPA 101 and UL 10B.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Folding partition, each type, including methods of installation.
 - .3 Manufacturers' Literature and Data: Folding partition each type.
 - .4 Test Reports:

1. Fire test response characteristics.
 2. Sound resistant partitions STC rating.
 - .5 Manufacturer's Certificates:
Certificate certifying that the partition referred to in the test reports conforms to specification requirements, and that the partitions to be provided for the project are the same in all characteristics as that tested in the laboratory.
 - .6 Manufacturer's qualifications.
 - .7 Installer's qualifications.
 - .8 Manufacturer's warranty.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
- .1 Submit one representative sample of fabric covering for each different partition, 152 mm square.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's recommendations.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.

1.7 RELATED WORK BY OTHERS:

- .1 Paint or other finishes to all trim and surrounding materials adjoining head and jamb of the accordion doors.
- .2 All headers, blockings, support, structures, jambs, track enclosures, surrounding insulation and sound baffles as quality assurance required.
- .3 Preparation of openings is the responsibility of the General Contractor. Any site conditions that do not comply with approved shop drawings must be promptly reported to the project architect.
- .4 Master key cylinders.

1.8 WARRANTY:

- .1 The accordion doors shall be guaranteed against defects materials and workmanship for a period of two (2) years. In addition, the pantographs, trolleys and tracks are guaranteed for ten (10) years. This warranty shall be effective upon the date of signature of the certificate relative to the substantial completion of work

2 Products

2.1 MATERIALS

- .1 Accordion doors supplied by Corflex: Model 4500
- .2 Door cover is a semi-rigid 5-ply laminated construction providing a wrinkle free impact resistant surface. Each ply must include laminated strips within each fold. Cover must be removable and replaceable on site.
- .3 # The accordion doors shall have an internal frame made from galvanized 2mm (14 gauge) of cold rolled steel riveted to « X » form pantographs. Pantographs shall

evenly deploy and retain their original shape on either straight or curved tracks. Pantographs shall have built-in stops to prevent over extension. Doors shall have top and bottom pantographs as well as intermediate ones located no more that 1220mm (4'0") on centers. Vertical steel posts shall support the pantographs at each door extremities.

#

.4 The front post must be adjustable and magnetic to facilitate the alignment to an uneven wall.

#

.5 Door locking option: Master key lock preparation on both sides.

.6 Surface covering of doors shall include noise insulation multi-ply sweep strips; 12mm (1/2") on top and 38mm (1 1/2") on bottom.

#

2.2 STORAGE

.1 The rolling post of the accordion door will latch to the wall jamb installed on the outside of the pocket door (by others).

2.3 SUSPENSION SYSTEM

.1 The track must be made of architectural quality clear anodized tempered aluminum (painted steel track and ceiling guard are not acceptable). Guide pins shall insure perfect alignment of the track junction points. Track must be in compliance with the manufacturer's standards to insure optimum operation of the door relative to its size and weight.

.2 The curved track will have a radius of 1220mm.

.3 Each accordion door must be supported by a four (4) wheel ball bearing carrier, secured to extremity posts. The intermediate carriers shall be space at 457mm (18") on center to properly distribute the door weight when manipulating. Wheel to be of nylon covered steel ball bearings.

2.4 ACCORDION DOOR FINISH

.1 Accordion door covering must be Fabric with acrylic backing and stain resistant treatment. To be factory installed and selected from manufacturer's standard product range.

2.5 OPERATION

.1 Accordion door shall be top supported and manually operated.

2.6 ACOUSTICAL PERFORMANCE AND ACCEPTABLE MANUFACTURES

.1 Provide a copy of the acoustic performance test report attesting that the accordion door was tested in an independent accredited acoustical laboratory on a fully operational unit of 4267mmX2743mm (14' 0" X 9' 0") in accordance with ASTM-E90. Test results must be equal or exceed the performance required in the quote. Acoustical test must specify weight and door construction.

- .2 Sound Transmission Class STC: 45 STC. The accordion doors must weigh between 6.5 and 25.0kg/m² (1.3 and 5.1lbs/ft²) subject to selected STC.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Installation is to be completed by an authorized factory trained installer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 The work of this Section includes all labour, materials, equipment and tools required to provide a complete project for the following scope of work as indicated on the Contract Documents:
 - .1 All windows located within the Community Building and adjacent links.
 - .2 All exterior and interior glazing, including sealed thermal units and window glazing.
 - .3 Weather sealing of glazing systems specified in this Section. Work includes air vapour barrier membrane supply and installation at perimeter of window assemblies, spray foam insulation at perimeter of window assemblies, perimeter caulking at the interior face of all window assemblies.
 - .4 Exterior and interior aluminum sills, trims and panels.
 - .5 Window operators complete with all hardware (including integral restrictors) and insect screens.

1.2 RELATED SECTIONS

- .1 Section 07 92 00 - Joint Sealing: caulking of joints between frames and other building components.
- .2 Section 07 27 00 – Air barriers - Performance
- .3 Section 08 11 00 – Hollow Metal Doors and Frames
- .4 Section 08 11 16 – Aluminum Doors and Frames
- .5 Section 08 14 16 – Wood Doors
- .5 Section 08 80 50 - Glazing
- .6 Section 08 90 00 - Louvres and Vents

1.3 REFERENCES

- .1 Aluminum Association (AA),
 - .1 AA DAF 45-[03(R2009)], Designation System for Aluminum Finishes.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-79.1-M91, Insect Screens.
- .3 Canadian Standards Association (CSA) International
 - .1 CSA-A440-00/A440.1-00(R2005), A440-00, Windows / Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows.
 - .2 CAN/CSA-Z91-02(R2008), Health and Safety Code for Suspended Equipment Operations.

1.4 QUALIFICATIONS

- .1 The work of this section shall be designed, fabricated and erected by a company with at least five years experience with projects of similar size and nature and with adequate plant equipment and skilled tradesman.

1.5 DESIGN CRITERIA

- .1 Windows: Conform to CSA-A440-00 including Appendix A.
 - .1 Accommodate thermal movement of component materials within service temperature range of -35 to +75 degrees Celsius without causing buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects.
 - .2 Design connection details to accommodate movement in window system, and to accommodate movement between window system and building structure, caused by structural movements, without permanent distortion, damage, racking, breakage of seals, or water penetrations.
 - .3 Provide for positive drainage of condensation occurring within wall construction and water entering at joints, to exterior face of wall in accordance with NRC "Rain Screen Principles" including:
 - .1 Provide pressure equalized cavity efficiently sealed to effectively deter penetration of water into the system.
 - .2 Make adequate provision to drain to the exterior any water or water vapour infiltration, exfiltration and to maintain the pressure equalized cavity.
 - .3 Provide adequate gasket and other seals for efficient control of air and vapour infiltration, exfiltration and maintenance of the pressure equalized cavity.
 - .4 Design members to withstand dead load, earthquake and other live loads as calculated in accordance with Ontario Building Code to max. allowable deflection of 1/200 of clear span of 20mm, whichever is the lesser. Minimum acceptable wind load; 1.00 kPa.
 - .5 Limit deflection of any member, in direction parallel to wall plane, when member carries its full design load, not to exceed 75% of design clearance dimension between that member and panel, glass or any part immediately below it.
 - .6 Limit air infiltration and exfiltration to maximum 0.18 litres/sec. per m² of glazing when tested to ASTM E283, at 75Pa pressure differential.

- .7 Exclude water penetration when tested to ASTM E331, at 0.72Pa pressure differential.
- .8 Provide thermal break for calculated temperature differential of 100 degrees Celsius when tested to CGSB 63-GP-12M.
- .9 Condensation: Nil at -25 degrees Celsius externally and +20 degrees Celsius internally with R.H. of 25% and nil before any of the exposed area of insulated glass reaches the dew point.
- .10 Conform to CSA-A440-00 except as otherwise called for.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim junction between combination units elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes fasteners, and caulking.
- .3 Show waterproofing and condensation control methods.
- .4 Indicate connections of windows to structural components of building. Connections to be designed and shop drawings to be stamped by a professional engineer in the Province of Ontario.
- .5 Prior to substantial completion, the engineer who stamped the shop drawings shall submit a stamped letter confirming that the window systems have been installed as per the approved shop drawings.

1.7 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit one representative model of each specified finish.

1.8 TEST REPORTS

- .1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, for:
 - .1 Windows classifications.
 - .2 anodized finish,
 - .3 Insect screens,
 - .4 Air tightness.

- .5 Water tightness.
- .6 Wind load resistance.
- .7 Condensation resistance.
- .8 Thermal performance.
- .9 Sash strength and stiffness - Operable Casement Projecting.
- .11 Forced entry resistance.
- .12 Mullian deflection - combination and composite windows.

1.9 CLOSEOUT
SUBMITTALS

- .1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.10 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.
- .4 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .5 Divert unused or damaged wood materials from landfill to recycling reuse composting facility approved by Consultant.
- .6 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .7 Divert unused caulking material from landfill to official hazardous material collections site approved by Engineer Consultant.
- .8 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

1.11 POST
INSTALLATION
CERTIFICATION

- .1 After installation, submit written certification, signed by the structural engineer responsible for the design indicated on the shop drawings, that all items have been installed in accordance

with the stamped shop drawings.

1.12 DELIVERY AND STORAGE

- .1 Deliver material factory formed and ready for installation
- .2 Handle, deliver, and store material in a manner so as to prevent soiling, marring of finished surfaces, twisting, denting and all other damages.
- .3 Ship material with shop applied protection over finished surfaces and corners padded.
- .4 Store at the site under cover and set above ground.

1.13 WARRANTY

- .1 The warranty period stated in General conditions, Warranty and relevant Supplementary Conditions, is with respect to this section of work, extended from one year to three years.
- .2 Warranty shall specifically guarantee against leakage, defects, and malfunction under normal usage. Warrant against defects in the material and labour of the work of this section and warrant that the work will remain structurally sound free from distortion and deformation under load and that glazing splines and sealant will be free from deterioration from sunlight, weather and oxidation.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Materials: to CSA-A440/A440.1 supplemented as follows:
- .2 All windows by same manufacturer.
- .3 Sash: Aluminum clad wood.
- .4 Main Frame: Aluminum clad wood
- .5 Glass: as per Section 08 80 50
- .6 Exterior metal sills: brake formed aluminum sheet metal of type and size as detailed; minimum 1.5 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors anchoring devices and end dams, and underlayment membrane of Thru-wall flashing.

- .7 Isolation coating: alkali resistant bituminous paint.
- .8 Steel attachments and reinforcements: to CAN3G 40.21-M87, grade 300W.
- .9 Bolts, screws and fasteners: Stainless steel, or cadmium plated corrosion-resistant steel of adequate strength for the purpose.
- .10 Exterior and Interior Aluminum Trim Panels: Extruded aluminum or break formed aluminum sheet metal to profiles and sizes indicated, min. 3mm thick.
- .11 Sealing Compound: Multi-component, polysulphide, chemical curing, high modulus, to CAN2-19.24-M90, Type 2, Movement Class 25, Class A, glazing.
- .12 Peripheral Sealants: In accordance with Section 07900. Colours as selected by Consultant.
- .13 Bedding Compound: To CGSB 19-GP-14-M76.
- .14 Zinc Rich Primer: To CGSB 1-GP-181M.
- .15 Air vapour barrier perimeter seal: in accordance with Section 07 27 00.
- .16 Foam Insulation around Windows and Doors:
 - .1 CF 812 by Hilti
- .17 Exterior Perimeter Trim: brake formed aluminum sheet metal; minimum 1.5 mm thick, over wood backing as required to close off between edge of window frame and new/existing masonry opening. Existing masonry openings are to be lined with new plywood window blocking as required. New Exterior trim to cover from window frame over shim space and plywood block to masonry veneer. Trim colour to match window frame cladding.

2.2 WINDOWS

- .1 Lepage Windows: Wood Collection, Aluminum clad wood windows.
 - .1 Fixed and casement windows.
 - .2 Pine species – main frame and sash
 - .3 Depth 116mm + extruded aluminum nosing/brick mould
 - .4 Aluminum clad, extruded 1.5mm th.
 - .5 Interior Finish: Lepage prime painted.
 - .6 Exterior Finish: to match existing windows (Ice White or Rainware White)
 - .7 Weather-strip – Silicone, polyflex.
 - .8 Glass as per Section 08 80 50
 - .9 Hardware – white finish.

- .10 Refer to Window Schedule for custom plant on trim on exterior of window.

2.3 WINDOW TYPE AND CLASSIFICATION

- .1 Types:
 - .1 Fixed and Casement: with double glazing insulating glass.
- .2 Classification rating: to CSA-A440/A440.1.
 - .1 Air tightness: A3.
 - .2 Water tightness: B7.
 - .3 Wind load resistance: C5.
 - .4 Condensation resistance: Temperature Index, I60
 - .5 Forced Entry: F2.
 - .6 Thermal performance: u value of 1.8 (maximum).

2.4 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 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.
- .3 Face dimensions detailed are maximum permissible sizes.
- .4 Brace frames to maintain squareness and rigidity during shipment and installation.
- .5 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40 380 g/m² zinc coating to CAN/CSA-G164.

2.5 FINISHES

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .2 Exterior exposed aluminum surfaces:
 - .1 Exterior Surfaces: to be chosen from standard clad colour selection.
- .3 Exterior of exposed infill panel and trim surfaces: to match adjacent window finish
- .4 Interior finish: Prime painted in shop.

- 2.6 GLAZING .1 Glaze windows in accordance with CSA-A440/A440.1. Refer to Section 08 80 50
- 2.7 AIR BARRIER AND VAPOUR RETARDER .1 Equip window frames with site installed air barrier and vapour retarder material for sealing to building air barrier and vapour retarder as follows:
- .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
 - .2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.
 - .3 Spray foam to fill shim space void at perimeter of windows.
 - .4 Caulking to interior perimeter of window frames to seal between window frame and air vapour barrier membrane.

PART 3 - EXECUTION

- 3.1 WINDOW INSTALLATION .1 Install in accordance with CSA-A440/A440.1.
- .2 Arrange components to prevent abrupt variation in colour.
 - .3 Set work plumb, square, level, free from warp, twist, and superimposed loads. Use only plastic horseshoe shims, no wood shims are permitted on this project.
 - .4 Secure work adequately and accurately to structure in required position, in manner not restricting thermal or wind movement. Final anchor settings after alignment.
 - .5 Anchor component parts to transmit loads and other stresses to anchorage system and hence to structure.
 - .6 Field measure and cut to fit aluminum flashings and miscellaneous trim. Pack voids with semi-rigid insulation and perimeter sim spaces with urethane foam insulation.
- 3.2 GLAZING .1 Glaze in accordance with Section 08 80 50.
- 3.3 PERIMETER OF WINDOWS .1 Existing masonry/stucco window openings to receive new plywood blocking surrounds as detailed. Seal between

back of plywood blocking and masonry opening with spray foam and caulking to provide air/vapour seal between plywood and masonry.

.2 Plywood blocking to receive air vapour barrier membrane as per section 07 27 00 as detailed.

.3 Fill perimeter voids of windows with foam in place insulation.

.4 Ensure surfaces are free of dust, oil, grease, frost, loose debris. Provide temporary bracing required to prevent bowing of adjacent frames. Mask adjacent exposed surfaces against damage.

.5 Provide adequate ventilation and protective apparel. Min. application temperature 5°C.

.6 Fill gaps, cracks, holes with foam. Make allowance for expansion of foam. Install foam into gaps and shim space in layered application to ensure full depth of joint is sealed. Allow each layer to cure before next layer is applied. Cut back excess foam after curing. Tool foam only when tack free.

.7 Caulk perimeter of window frame on the interior side to the air/vapour barrier membrane applied to the plywood blocking to form air /vapour seal.

.8 Apply aluminum clad trim to exterior perimeter of window frames to close off between window frame and existing masonry opening as detailed.

3.4 SILL INSTALLATION

.1 Install through wall flashing membrane as per Section 07 27 00 below metal sills from window sill frame out and over precast concrete sills below where metal sill covers membrane.

.2 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.

.3 Secure sills in place with anchoring devices located at ends and evenly spaced 600 mm on centre in between.

.4 Fasten expansion joint cover plates and drip deflectors with self tapping stainless steel screws.

.5 Maintain 6 to 9 mm space between butt ends of continuous sills.

For sills over 1200 mm in length, maintain 3 to 6 mm space at each end.

- .6 Install end dam flashings at ends of sills as detailed c/w return flange under sill.

3.5 CAULKING

- .1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .2 Apply sealant in accordance with Section 07 92 00 - Joint Sealing. Conceal sealant within window units except where exposed use is permitted by Consultant.
- .3 Apply spray foam insulation to fill voids around windows. Apply in multiple passes to ensure complete cavity is filled solid.

3.6 PROTECTION

- .1 During construction protect framing and glass against damage from plaster, mortar and other causes.
- .2 Protect pre-finished aluminum surfaces with protective coatings or wrappings until the installation of glazing commences. Ensure that method of protection does not damage finish.

3.7 CLEANING

- .1 Remove as work progresses, corrosive, hardening, or foreign matter or droppings resulting from the work.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 08 11 00 - Hollow Metal Doors and Frames
 - .2 Section 08 11 16 - Aluminum Doors and Frames
 - .3 Section 08 14 16 - Flush Wood Doors
 - .4 Section 26 00 00 - Electrical
- 1.2 REFERENCES
- .1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
 - .2 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction) : standard hardware location dimensions, or as indicated for special conditions.
 - .3 CAN CSA B-651-12 Accessible Design for the Built Environment.
 - .4 American National Standards Institute / Builders Hardware Manufacturers Association.
- 1.3 SUBMITTALS
- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheets indicating hardware proposed, including ANSI function where ANSI used in this specification, grade, type, series, BHMA finish, fire label listing, in accordance with Section 01 – General Instructions.
 - .2 Samples:
 - .1 When requested, submit samples of each type of hardware specified in accordance with Section 01 – General Instructions.
 - .2 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
 - .3 After approval samples will be returned for incorporation in the Work.
 - .3 Hardware List:
 - .1 Submit a typewritten Finishing Hardware schedule in accordance with Section 01 - General Instructions.
 - .2 Indicate specified hardware, including make, model, base material, function, size, finish and other pertinent information.

1.3 SUBMITTALS

(Cont'd)

- .3 When preparing the Finish Hardware schedule to submit for approval review specifications and drawings, confirming quantities and detailing, reporting any errors and/or omissions to the Architect. "Extras" will not be considered nor accepted for necessary changes as a result of the Contractor's neglect.
- .4 "Extras" will be invoiced at no more than 30% off Manufacturer's current list price. "Credits" will be issued at no less than 70% off Manufacturer's current list price.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .5 Closeout Submittals:
 - .1 Provide operation, maintenance data, parts list and manufacturer's instructions for each type of locksets, fire exit hardware, door closers, door operators and door holders for incorporation into manual specified in Section 01 - General Instructions.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Use hardware for doors in fire separations and exit doors certified by a Canadian Certification organization accredited by Standards Council of Canada.
 - .2 All fire and life safety codes shall be met as required by the authority having jurisdiction.
 - .3 Use lock and latchsets with lever handles meeting requirements of CAN/CSA-B651, Barrier Free Design, unless specified otherwise.
- .2 Pre-installation Meetings:
 - .1 Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .3 Qualifications :
 - .1 It shall be clearly understood that within the terms of this Subcontract, the Door Hardware Supplier is bound not just as a supplier, but as a Subcontractor and is responsible for the supply of Project services relative to project co-ordination, supervision and inspection.
 - .2 No claims for extra money will be entertained if such claims are from lack of co- ordination between the Hardware Subcontractor and any other Subcontractor. Ensure that Work of other Subcontractors, as it proceeds, will accommodate the installation of hardware.
 - .3 Attend site meetings as requested by the Contractor.

1.5 DELIVERY, STORAGE
AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
- .1 Deliver, store, handle and protect materials in accordance with Section 01 00 10 - General Instructions.
 - .2 Store finishing hardware in locked, clean and dry area.
 - .3 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

1.6 WASTE DISPOSAL AND
MANAGEMENT

- .1 Environmental:
- .1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions.
 - .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
 - .3 Dispose of all 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 00 00 - General Instructions.
 - .2 Supply two sets of wrenches for locksets, door closers and door openers.

PART 2 - PRODUCTS2.1 HARDWARE ITEMS

- .1 Door hardware, as specified, to be certified to ANSI/BHMA standards.
- .2 Use one manufacturer's products only for all similar items.

2.2 DOOR HARDWARE

Hinges	Hager Hinge
Continuous Hinges	Roton Hager Hinge
Ar Deadbolts	Adams Rite
Locksets	Schlage
Exit Devices	Von Duprin
Security Cylinders	Medeco
Door Closers	LCN
Door Openers (LP-low profile)	Hunter Automatics
Kick Plates	Standard Metal
O/H Stops/holders	Glynn-Johnson
Threshold & W/Stripping	K.N. Crowder

2.3 FASTENINGS

- .1 All hardware is to be installed using manufactures' supplied fasteners. Failure to comply may void warranties and applicable licensed labels.
- .2 Self tapping/tek screws used for installation of butt hinges, locksets, exit devices, flushbolts, door closers and kick plates **will not be acceptable** on this project.
- .3 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .4 Exposed fastening devices to match finish hardware.
- .5 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .6 Push plates and kick plates shall be supplied with countersunk, oval head socket screws to suit door material except where noted tape.

2.4 KEYING

- .1 The Door Hardware Supplier is responsible for preparing a detailed keying schedule in co-operation with and to approval of the Owner.
- .2 All locks shall be keyed into an existing Medeco keying system as follows:
 - master keyed
 - keyed alike or different as required.
- .3 Supply (2) change keys per cylinder.
- .4 All permanent keys are to be delivered directly to the Owner.
- .5 The Contractor is responsible for providing cylinders as required for his own use during the period of construction.

2.5 FINISHES

- .1 Recommended Practices for Materials and Finishes:
- | | | |
|--------------------|----------|------------------------------|
| Hinges | 630 | stainless steel metal, satin |
| | 646 | satin nickel on steel |
| Continuous Hinges | ANO AL | clear anodized aluminum |
| Locksets | 619 | satin nickel |
| Cylinders | 619 | satin nickel |
| Exit Devices | 689 | aluminum, |
| | 630 | stainless steel, satin |
| Door Pulls | 316 S.S. | 316 grade stainless steel |
| | 630 | stainless steel, satin |
| Flushbolts | 619 | satin nickel |
| Door Closers | 689 | powder coat aluminum |
| | SRI | special rust inhibitor |
| Door Openers | CLR ANO | clear anodized aluminum |
| Kick Plates | 630 | stainless steel, satin |
| O/H Stops/holders | 630 | stainless steel, satin |
| Floor/Wall Stops | 646 | satin nickel |
| Threshold | AL | clear anodized aluminum |
| & Weatherstripping | | |
| Door Sweeps | AL | clear anodized aluminum |

2.6 ABBREVIATIONS

ALF	aluminum frame
T.B. ALF	thermally broken aluminum frame
INS. HMD	insulated hollow metal door
HMD	hollow metal door
PSF	pressed steel frame
SCWD	solid core wood door
WF	wood frame
LH	left hand
RH	right hand
LHR	left hand reverse
RHR	right hand reverse
HR/FR	hour fire rated
MK	master keyed
KD	keyed different

2.7 WARRANTY

- .1 All hardware supplied under the approved hardware schedule will be guaranteed for a period of one (1) year after final acceptance of the project. Door closers will be guaranteed for thirty (30) years. Door openers to be warrantied for a period of two (2) years.

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.
- .2 When requested, furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturer's instructions for proper installation of each hardware component.

3.2 INSTALLATION

- .1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association, or as indicated for special conditions.
- .2 Only tradesmen competent in the installation of Finishing Hardware shall be used for this purpose. Qualification would require a minimum (5) years experience in commercial application. The installer shall adjust, clean and make good all installation of Finishing Hardware to the satisfaction of the Architect and Consultants.
- .3 The Contractor is responsible for ensuring the door preps for cylinder holes are where required and are aligned properly with mortise locks. The Contractor is to use his own "try-out" cylinders prior to the Owner beginning installation of the permanent cylinders. Any holes found to be misaligned will be rectified by the Contractor.
- .4 Section 26 (Electrical) to provide backboxes, conduits c/w pull wires and power supply for all access control systems and related hardware.
- .5 Section 26 (Electrical) to provide backboxes, conduits c/w pull wires and power supply (115V @ headers) for door opener systems. Install all door hardware for operation of door operators at not less than 900mm and not more than 1100mm above the finished floor as per O.B.C..
- .6 The Door Hardware Supplier is responsible for the installation of the Hunter Automatics door openers and all related hardware. An AAADM certified technician to be approved by the Manufacturer as having the qualifications to ensure the proper operation of all components related to the opener systems.

3.2 INSTALLATION (Cont'd)

- .7 Wiring schematics (portals) detailing all electrical components for each opening to be supplied by the Door Hardware Supplier. Drawings to indicate all components of systems listed under this Section. Power supplies are listed sized and with option cards as required. The Door Hardware Supplier is responsible for co-ordinating with Electrical exact locations of power supplies.
- .8 Kick plates are to be installed 0.79mm maximum up from the bottom edge of door push side. On single doors install in the centre of the door equally spaced to clear between the frame jamb stops. On pairs of doors install 6.35mm maximum from meeting edge of doors and the correct distance away from hinge edge of door to clear frame jamb stop.
- .9 Contractor to ensure walls are properly blocked to prevent future damage wherever surface mounted hardware i.e. wall stops are to be used.
- .10 Thresholds are to be extended from masonry opening to masonry opening and are to be coped around the pressed steel frames. Installer to caulk threshold base to ensure proper seal.
- .11 Weatherstripping, gasketing, etc is not to be installed until final coat of paint has been applied to the door and frame and is completely dry.
- .12 Door Supplier, when templating, must consider surface mounted w/stripping W-20S which is 8.0mm thick. Exit device strikes, door closer parallel arm brackets and overhead stop/holder brackets will mount on top of the weatherstripping.

3.3 ADJUSTING

- .1 Adjust door hardware for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp cloth and approved non-abrasive cleaner. Polish hardware in accordance with manufacturer's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.5 DEMONSTRATION

- .1 Maintenance Staff Briefing:
 - .1 Brief maintenance staff regarding:
 - .1 Proper care, cleaning and general maintenance of projects complete hardware.
 - .2 Description, use, handling, and storage of keys.
 - .3 Use, application and storage of wrenches for latchsets.
 - .2 Demonstrate operation, operating components, adjustment features and lubrication requirements.

3.6 INSPECTIONS

- .1 The Door Hardware Supplier shall make periodic site inspections during installation of hardware to ensure that all hardware supplied is being applied in accordance with specifications, details and Architect's directions. Inform the Contractor and the Architect in writing of such inspections, pointing out errors, omissions, etc.; so that same may be corrected.
- .2 The Door Hardware Supplier will contact product representatives (locksets, exit devices and door closers/auto door openers) who will also make inspections during construction to ensure the proper installation and adjustment of their products. Final inspection to be carried out by the Door Hardware Supplier and Product Representative. Representative to provide written certification that hardware has been installed and adjusted as intended.

3.6 INSPECTIONS(Cont'd)

- .3 The first inspection listed above by the Door Hardware Supplier and product representative shall occur and be submitted within 5 working days of the hardware installation reaching 25% completion. The Consultant will review the submitted inspection report and perform a sampling review of the completed installations to assess if the work to date is in compliance with the Contract requirements. The Contractor shall make all required adjustments to the installed hardware as per the findings of the Consultant and ensure all future installations and reports comply with these findings.
- .4 Subsequent inspections and reports shall be completed and submitted by the Contractor at the 50%, 75% and 100% stages of the door hardware installations.
- .5 NO PAYMENTS SHALL BE CERTIFIED FOR DOOR HARDWARE INSTALLATIONS UNTIL THE FINAL INSPECTION REPORT HAS BEEN SUBMITTED BY THE CONTRACTOR AT THE END OF THE PROJECT AND ACCEPTED BY THE CONSULTANT.

3.7 HARDWARE SCHEDULE

- .1 The following is a list of hardware to be used to meet the Clients existing standards on this project. Any deviation from The hardware scheduled shall be replaced with the proper hardware at the Door Hardware Supplier's expense. Acceptable alternates as listed. Substitutions without prior approval will not be accepted in the shop drawing submission.
- .2 Hardware schedule as follows:

BASEMENT FLOOR / LEVEL ONE

<u>ITEM #1</u>	1 SGLE DOOR B02.1 914 x 2032 x 45 TYPE B/4	EXIT VESTIBULE B03 FROM STAIR B02 INS. HMD/PSF 3/4 HR/FR	LHR
	3 EA HINGE	BB1191 114 x 101mm NRP	630
	1 EA EXIT DEVICE	22NL-F x 230NL	689
	1 EA RIM CYLINDER	MEDECO 10W0400H x MK	619
	TO BE CROSS KEYED TO ACCEPT SUITE ENTRY DOOR KEYS		
	1 EA DOOR CLOSER	4111 EDA x 62G SHOE & B/ARM ST-2730	SRI 689
	1 EA KICK PLATE	K10A 203.2 x 863mm x MS	630
	1 EA O/H STOP	GJ 904S x 90 DEGREE	630
	1 LEN THRESHOLD	CT-32 x 1016mm	AL
	CONFIRM ON SITE ACTUAL WIDTH REQUIRED PRIOR TO ORDERING		
	1 LEN THRESHOLD LIP	CT-40S x 914mm	AL
	1 EA DOOR SWEEP	W-24S x 914mm	AL
	1 SET W/STRIPPING	W-20S x 1/914 + 2/2032mm	AL
	INSTALL BEFORE EXIT DEVICE STRIKE, DOOR CLOSER & O/H STOP		

<u>ITEM #2</u>	1 SGLE DOOR B0231 914 x 2032 x 45 TYPE EX-B/EX-4	EXIT VESTIBULE B03 FROM EXISTING GARAGE B01 EXISTING HMD/EXISTING PSF	LHR
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EXISTING REPLACED DOOR, FRAME & HARDWARE TO REMAIN

GROUND FLOOR / LEVEL TWO

<u>ITEM #3</u>	1 SGLE DOOR 101.1 914 x 2133 x 45 TYPE B/1	STAIR 101 FROM VESTIBULE 104a HMD/PSF 3/4 HR/FR	RHR
	3 EA HINGE	BB1279 114 x 101mm	646
	1 EA EXIT DEVICE	99L-F x BE-996L-R (17)	619
	1 EA DOOR CLOSER	1461 REG LPA	689
	1 EA KICK PLATE	K10A 152.4 x 876mm x TAPE	630
	1 EA WALL STOP	S120	619

<u>ITEM #4</u>	1 SGLE DOOR 102.1 762 x 2133 x 45 TYPE B/6	VESTIBULE 104a TO STORAGE 5 102 SCWD/PSF	LH
	3 EA HINGE	BB1279 114 x 101mm	646
	1 EA LOCKSET	AL80LD x NEP	619
	1 EA CYLINDER	MEDECO 20W20049 x MK x KD	619
	1 EA DOOR CLOSER	1461 REG LPA DEL	689
	1 EA KICK PLATE	K10A 152.4 x 724mm x TAPE	630
	1 EA WALL STOP	S120	619
<u>ITEM #5</u>	1 SGLE DOOR 103.1 965 x 2133 x 45 TYPE B/6	VESTIBULE 104a TO WC 103 SCWD/PSF	RH
	3 EA HINGE	BB1279 127 x 101mm	646
	1 EA LOCKSET	AL80LD x NEP x LESS STRIKE	619
	1 EA CYLINDER	MEDECO 20W20049 x MK x KD	619
	1 EA ELECTRIC STRIKE	6211 FS (FAIL SAFE) CONFIRM VOLTAGE POWER SUPPLY THROUGH OPENER SYSTEM	630
	1 EA DOOR OPENER	HL-8-LP (LOW PROFILE) c/w E/S RELAY (PULL SIDE MTG.) c/w FLAT ARM & BRACKET APPLICATION c/w FULL LENGTH HOUSING	CLR
	2 EA WALL ACTUATOR	CM-60/2	630
	2 EA ESCUTCHEON	CM-69	BLK
	1 EA WASHROOM RELAY KIT CX-WC11	INCLUDES: 'PUSH TO LOCK' CM-400R/8FE (ENGLISH & FRENCH) c/w ILLUMINATED RED MUSHROOM BUTTON LED ANNUNCIATOR CM-AF500FE RED 'OCCUPIED/ OCCUPE' (ENGLISH & FRENCH) MAGNETIC DOOR CONTACT CX-MDA	
	1 EA EMERGENCY ASSISTANT KIT CXWEC10E	c/w BILINGUAL SIGNAGE	
	1 EA LOGIN CONTROL RELAY CX-33		
	1 EA EMERGENCY ASSIST KIT CX-WEC10FE	c/w BILINGUAL SIGNAGE	
	1 EA KICK PLATE	K10A 304.8 x 927mm x TAPE	630
	1 EA WALL STOP	S122	619

LOCATION OF ACTUATORS TO BE CONFIRMED.

EMERGENCY ASSIST SYSTEM CONSISTS OF AUDIBLE AND VISUAL SIGNAL DEVICES INSIDE AND OUTSIDE OF THE WASHROOM, CONTROL DEVICE INSIDE THE WASHROOM AND EMERGENCY SIGNAGE AS PER O.B.C.

ELECTRIC STRIKE TO RELEASE UPON SIGNAL FROM EMERGENCY ASSIST SYSTEM ALLOWING RESPONDERS ACCESS TO WASHROOM WITHOUT HAVING TO UNLOCK OUTSIDE LEVER.

<u>ITEM #6</u>	1 SGLE DOOR 104.1	EXISTING CORR. C 117 FROM CORR. A 104	LHR
<u>ITEM #7</u>	1 SGLE DOOR 104.2	EXISTING CORR. B 117 FROM CORR. A 104	RHR
	965 x 2133 x 45	HMD/PSF	
	TYPE G, GR/5	3/4 HR/FR	
	6 EA HINGE	BB1279 127 x 101mm	646
	3 EA EXIT DEVICE	99L-F x BE-996L-R (17) 619 x 4FT	630
	3 EA DOOR CLOSER	1461 REG LPA DEL	689
	3 EA KICK PLATE	K10A 152.4 x 927mm x TAPE	630
	ELECT. MAGNETIC DOOR HOLDERS SUPPLIED BY ELECTRICAL		
<u>ITEM #8</u>	1 PAIR DOORS 105.1	CORR. A 104 TO LIBRARY 105	LH/RH
	2/914 x 2133 x 45	SCWD/PSF	
	TYPE E/6a		
	6 EA HINGE	BB1279 114 x 101mm	646
	2 EA DUMMY LATCHSET	AL10S NEP x LESS SPRING LATCH/STRIKE	619
	2 EA BALL CATCH	347	619
	2 EA KICK PLATE	K10A 152.4 x 889mm x TAPE	630
	2 EA FLOOR STOP	S101	619
<u>ITEM #9</u>	1 SGLE DOOR 106.1	CORR. A 104 TO JANITOR/STORAGE 106	RH
	864 x 2133 x 45	SCWD/PSF	
	TYPE B/6	3/4 HR/FR	
	3 EA HINGE	BB1279 114 x 101mm	646
	1 EA LOCKSET	AL80LD x NEP	619
	1 EA CYLINDER	MEDECO 20W20049 x MK x KD	619
	1 EA DOOR CLOSER	1461 REG LPA DEL	689
	1 EA KICK PLATE	K10A 152.4 x 825mm x TAPE	630
	1 EA WALL STOP	S120	619
<u>ITEM #10</u>	1 SGLE DOOR 107.1	CORR. A 104 TO OFFICE 107	RH
	965 x 2133 x 45	SCWD/PSF	
	TYPE B/6a		
	3 EA HINGE	BB1279 127 x 101mm	646
	1 EA LOCKSET	AL50LD x NEP	619
	1 EA CYLINDER	MEDECO 20W20049 x MK x KD	619
	1 EA KICK PLATE	K10A 152.4 x 927mm x TAPE	630
	1 EA FLOOR STOP	S101	619

<u>ITEM #11</u>	1 PAIR DOORS 108.1 2/914 x 2133 x 45 TYPE B/2	EXTERIOR FROM STORAGE - 3 108 INS. HMD/PSF	LHR/RHR-A
	6 EA HINGE	BB1191 114 x 101mm NRP	630
	1 EA LOCKSET	AL80LD x NEP	619
	1 EA CYLINDER	MEDECO 20W20049 x MK x KD	619
		CUT/FILE STRIKE LIP FLUSH WITH FACE OF DOOR	
	2 EA FLUSHBOLT	FB458 x 304.8mm	619
	2 EA O/H STOP/HOLD	GJ 904H x 95 DEGREE	630
	1 LEN THRESHOLD	CT-32 x 1930mm	AL
		CONFIRM ON SITE ACTUAL WIDTH REQUIRED PRIOR TO ORDERING	
	1 LEN THRESHOLD LIP	CT-40S x 1828mm	AL
	2 EA DOOR SWEEP	W-24S x 914mm	AL
	2 LEN W/STRIPPING	W-16S x 2133mm (JAMBS)	AL
	1 LEN W/STRIPPING	W-20S x 1828mm (HEAD)	AL
		INSTALL BEFORE O/H STOP/HOLDERS	
	1 LEN ASTRAGAL	W-8SP x 2133mm	600
	1 LEN W/STRIPPING	KNC 6216 3.18mm x 12.7mm x 2133mm	BLK
		INSTALL ON ASTRAGAL	
<u>ITEM #12</u>	1 SGLE DOOR 109.1 965 x 2133 x 45 TYPE C/6	CORR. A 104 FROM FITNESS 109 SCWD/PSF	RHR
	3 EA HINGE	BB1279 127 x 101mm	646
	1 EA EXIT DEVICE	99L x 996L-R (17) 619 x 4FT	630
	1 EA RIM CYLINDER	MEDECO 10W0400H x MK	619
		TO BE CROSS KEYED TO ACCEPT SUITE ENTRY DOOR KEYS	
	1 EA DOOR CLOSER	1461 PA DEL	689
	1 EA KICK PLATE	K10A 152.4 x 927mm x TAPE	630
	1 EA MOP PLATE	K10A 152.4 x 952mm x TAPE	630
	1 EA WALL STOP	S120	619

<u>ITEM #13</u>	1 SGLE DOOR 109.2 1070 x 2133 x 51 CONFIRM TYPE Dr/3	EXTERIOR FROM FITNESS 109 ALDT.B. ALF WIDE STILE INSULCLAD	LHR
	1 EA CONT. HINGE	SL11 HD	ANO AL
	1 EA DEADBOLT	MS 1852S-4 38.1mm BACKSET c/w FACE PLATE SHAPE TO SUIT EDGE OF DOOR INSTALL CYLINDER CENTERED ON DOOR PULL NOT LESS THAN 900mm CENTER LINE ABOVE THE FINISHED FLOOR AS PER O.B.C.	628
	1 EA STRIKE	4001-012	628
	2 EA CYLINDER	MEDECO 10W0200 c/w CAM TO SUIT x MK TO BE CROSS KEYED TO ACCEPT SUITE ENTRY DOOR KEYS	619
	1 EA CYLINDER GUARD	MS4043	603
	1 SET DOOR PULL & PUSH BAR	3012-2 + 6000-2 CONFIRM CENTRES #5 B TO B MTG. @ TOP COMMON END x #5 SGLE MTG. x RIVNUT c/w 2 (DOUBLE) SET SCREWS FOR EACH POST	316 S.S. 630
	1 EA DOOR CLOSER	4020 TJ x AVB ST-2997 CONFIRM REVEAL AND LONG ARM REQUIREMENT	SRI 689
	1 EA ADAPTER PLATE	4020-18G	SRI 689
	1 EA O/H STOP	GJ 105S x 95 DEGREE	630
		T.B. THRESHOLD BY DOOR AND FRAME MANUFACTURER	
		DOOR SWEEP BY DOOR AND FRAME MANUFACTURER	
		W/STRIPPING BY DOOR AND FRAME MANUFACTURER	
	1 EA DOOR SWEEP	W-24S x 1070mm (EXTERIOR SIDE)	AL
<u>ITEM #14</u>	1 SGLE DOOR 110.1 965 x 2133 x 45 TYPE C/6	CORR. A 104 TO KITCHEN 110 SCWD/PSF	RH
	3 EA HINGE	BB1279 127 x 101mm	646
	1 EA LATCHSET	AL10S x NEP	619
	1 EA KICK PLATE	K10A 152.4 x 927mm x TAPE	630
	1 EA O/H STOP/HOLD	GJ 904F x 90 DEGREE DEADSTOP	630
<u>ITEM #15</u>	1 PAIR DOORS 110.2 2/600 x 2133 x 45 TYPE A/6	COMMON ROOM 111 FROM KITCHEN 110 SCWD/PSF	RHR/LHR-A
	6 EA HINGE	BB1279 114 x 114mm NRP	646
	1 EA DEADLOCK	L462L	
	2 EA CYLINDER	MEDECO 10W0200 x MK TO BE CROSS KEYED TO ACCEPT SUITE ENTRY DOOR KEYS	619
	1 EA FLUSHBOLT	FB458 x 304.8mm (TOP)	619
	1 EA CYLINDER PULL	H407	619

<u>ITEM #16</u>	1 SGLE DOOR 111.1 965 x 2133 x 45 TYPE F/7	CORR. A 104 FROM COMMON ROOM 111 SCWD/PSF	LHR
	3 EA HINGE	BB1279 127 x 101mm	646
	1 EA EXIT DEVICE	99L x 996L-R (17) 619 x 4FT	630
	1 EA RIM CYLINDER	MEDECO 10W0400H x MK	619
	TO BE CROSS KEYED TO ACCEPT SUITE ENTRY DOOR KEYS		
	1 EA DOOR CLOSER	1461 PA DEL	689
	1 EA KICK PLATE	K10A 152.4 x 927mm x TAPE	630
	1 EA MOP PLATE	K10A 152.4 x 952mm x TAPE	630
	1 EA WALL STOP	S120	619
<u>ITEM #17</u>	1 PAIR DOORS 112.1 2/812 x 2133 x 45 TYPE A/6	COMMON ROOM 111 FROM STOR-2 112 SCWD/PSF	RHR-A
	6 EA HINGE	BB1279 114 x 101mm	646
	2 EA DUMMY LATCHSET	AL10S NEP x LESS SPRING LATCH/STRIKE	619
	2 EA BALL CATCH	347	619
	2 EA O/H STOP/HOLD	GJ 453F x 95 DEGREE	630
<u>ITEM #18</u>	1 PAIR DOORS 113.1	CRAFTS/HOBBY 114 FROM STOR-1 113	LHR-A
<u>ITEM #19</u>	1 PAIR DOORS 113.2 2/764x 2133 x 45 TYPE A/6	CRAFTS/HOBBY 114 FROM STOR-1 113 SCWD/PSF	RHR-A
	12 EA HINGE	BB1279 114 x 101mm	646
	4 EA DUMMY LATCHSET	AL10S NEP x LESS SPRING LATCH/STRIKE	619
	4 EA BALL CATCH	347	619
	4 EA O/H STOP/HOLD	GJ 453F x 90 DEGREE	630
<u>ITEM #20</u>	1 SGLE DOOR 114.1 965 x 2133 x 45 TYPE C/6	CORR. A 104 FROM CRAFTS/HOBBY 114 SCWD/PSF	LHR
	3 EA HINGE	BB1279 127 x 101mm	646
	1 EA EXIT DEVICE	99L x 996L-R (17) 619 x 4FT	630
	1 EA RIM CYLINDER	MEDECO 10W0400H x MK	619
	TO BE CROSS KEYED TO ACCEPT SUITE ENTRY DOOR KEYS		
	1 EA DOOR CLOSER	1461 PA DEL	689
	1 EA KICK PLATE	K10A 152.4 x 927mm x TAPE	630
	1 EA MOP PLATE	K10A 152.4 x 952mm x TAPE	630
	1 EA WALL STOP	S120	619

<u>ITEM #21</u>	1 SGLE DOOR 114.2 1070 x 2133 x 51 CONFIRM TYPE D/3	EXTERIOR FROM CRAFTS/HOBBY 114 ALDT.B. ALF WIDE STILE INSULCLAD	RHR
	1 EA CONT. HINGE	SL11 HD	ANO AL
	1 EA DEADBOLT	MS 1852S-4 38.1mm BACKSET c/w FACE PLATE SHAPE TO SUIT EDGE OF DOOR INSTALL CYLINDER CENTERED ON DOOR PULL NOT LESS THAN 900mm CENTER LINE ABOVE THE FINISHED FLOOR AS PER O.B.C.	628
	1 EA STRIKE	4001-012	628
	2 EA CYLINDER	MEDECO 10W0200 c/w CAM TO SUIT x MK TO BE CROSS KEYED TO ACCEPT SUITE ENTRY DOOR KEYS	619
	1 EA CYLINDER GUARD	MS4043	603
	1 SET DOOR PULL & PUSH BAR	3012-2 + 6000-2 CONFIRM CENTRES #5 B TO B MTG. @ TOP COMMON END x #5 SGLE MTG. x RIVNUT c/w 2 (DOUBLE) SET SCREWS FOR EACH POST	316 S.S. 630
	1 EA DOOR OPENER	HA-8-LP (PUSH SIDE MTG.) c/w FLAT ARM & BRACKET APPLICATION	CLR ANO
	2 EA ACTUATOR	CM-60/2	630
	2 EA ESCUTCHEON	CM-69S	BLK
	1 EA WEATHER GASKET WR		
	1 EA O/H STOP	GJ 105S x 95 DEGREE	630
		T.B. THRESHOLD BY DOOR AND FRAME MANUFACTURER DOOR SWEEP BY DOOR AND FRAME MANUFACTURER W/STRIPPING BY DOOR AND FRAME MANUFACTURER	
	1 EA DOOR SWEEP	W-24S x 1070mm (EXTERIOR SIDE)	AL
	LOCATION OF ACTUATORS TO BE CONFIRMED		
<u>ITEM #22</u>	1 SGLE DOOR 115.1 965 x 2133 x 45 TYPE C/6	CORR. A 104 TO LAUNDRY 115 SCWD/PSF	RH
	3 EA HINGE	BB1279 127 x 101mm	646
	1 EA LATCHSET	AL10S x NEP	619
	1 EA KICK PLATE	K10A 152.4 x 927mm x TAPE	630
	1 EA WALL STOP	S120	619
<u>ITEM #23</u>	1 SGLE DOOR 116.1 914 x 2133 x 45 TYPE B/1	CORR. A 104 FROM ROOF ACCESS 116 HMD/PSF 3/4 HR/FR	RHR
	3 EA HINGE	BB1279 114 x 101mm NRP	646
	1 EA LOCKSET	AL80LD x NEP	619
	1 EA CYLINDER	MEDECO 20W20049 x MK x KD	619
	1 EA DOOR CLOSER	1461 PA	689

<u>ITEM #24</u>	1	SGLE DOOR 117.1 914 x 2133 x 45 TYPE H/8	EX. CORR. B 117 FROM EXTERIOR INS. METAL CLAD WD/WF	RHR
	3	EA HINGE	RCBB-991H 101 x 105.82mm (SPECIAL)	630
	1	EA EXIT DEVICE	99L x BE-996L-R (17) 619 c/w WEEP HOLES	630
	1	EA ELECT. MAG LOCK	M490 TOP JAMB (INSWING)	
	2	EA WARNING SIGN	"EMERGENCY EXIT UNLOCKED BY FIRE ALARM" 1/ENGLISH & 1/FRENCH	
	1	EA POWER SUPPLY	PS902 x 900-FA LOCATION TO BE CONFIRMED	
	2	EA KEY SWITCH	653-15-L2 (MOMENTARY) SINGLE GANG ELECTRICAL BOXES BY OTHERS LOCATIONS TO BE CONFIRMED (1) EXTERIOR TO ALLOW EGRESS FROM TERRACE (1) INTERIOR TO ALLOW ACCESS TO TERRACE	630
	2	EA CYLINDER	MEDECO 10W0200 x MK EXTERIOR & INTERIOR KEY SWITCH/CYLINDER TO TURN OFF POWER (MOMENTARY) TO MAGNET TO ALLOW UTHORIZED ACCESS THROUGH DOOR EXISTING KEY SWITCH AT FIRE ALARM PANEL TO REMAIN	619
	1	EA DOOR CLOSER	1460T HINGE (PULL) SIDE MOUNTING	689
		THRESHOLD	SUPPLIED BY FRAME MANUFACTURER	
		DOOR BOTTOM	SUPPLIED BY DOOR MANUFACTURER	
		W/STRIPPING	SUPPLIED BY FRAME MANUFACTURER	

<u>ITEM #25</u>	1	SGLE DOOR 118.1 914 x 2133 x 45 TYPE H/8	EX. CORR. C 117 FROM EXTERIOR INS. METAL CLAD WD/WF	LHR
	3	EA HINGE	RCBB-991H 101 x 105.82mm (SPECIAL)	630
	1	EA EXIT DEVICE	99L x BE-996L-R (17) 619 c/w WEEP HOLES	630
	1	EA ELECT. MAG LOCK	M490 TOP JAMB (INSWING)	
	2	EA WARNING SIGN	"EMERGENCY EXIT UNLOCKED BY FIRE ALARM" 1/ENGLISH & 1/FRENCH	
	1	EA POWER SUPPLY	PS902 x 900-FA LOCATION TO BE CONFIRMED	
	2	EA KEY SWITCH	653-15-L2 (MOMENTARY) SINGLE GANG ELECTRICAL BOXES BY OTHERS LOCATIONS TO BE CONFIRMED (1) EXTERIOR TO ALLOW EGRESS FROM TERRACE (1) INTERIOR TO ALLOW ACCESS TO TERRACE	630
	2	EA CYLINDER	MEDECO 10W0200 x MK EXTERIOR & INTERIOR KEY SWITCH/CYLINDER TO TURN OFF POWER (MOMENTARY) TO MAGNET TO ALLOW UTHORIZED ACCESS THROUGH DOOR EXISTING KEY SWITCH AT FIRE ALARM PANEL TO REMAIN	619
	1	EA DOOR CLOSER	1460T HINGE (PULL) SIDE MOUNTING	689
		THRESHOLD	SUPPLIED BY FRAME MANUFACTURER	
		DOOR BOTTOM	SUPPLIED BY DOOR MANUFACTURER	
		W/STRIPPING	SUPPLIED BY FRAME MANUFACTURER	

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED SECTIONS**
- .1 Section 07 92 00 - Joint Sealers.
 - .2 Section 08 00 00 - Door Schedule
 - .3 Section 08 11 16 - Aluminum Doors and Frames
 - .4 Section 08 50 00 - Windows
- 1.2 REFERENCES**
- .1 American National Standards Institute (ANSI).
 - .1 ANSI/ASTM E330-02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C 542-05, Specification for Lock-Strip Gaskets.
 - .2 ASTM D 2240-05, Test Method for Rubber Property - Durometer Hardness.
 - .3 ASTM E 84-10, Test Method for Surface Burning Characteristics of Building Materials.
 - .4 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .3 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, (Amendment) Insulating Glass Units.
 - .7 CAN/CGSB-12.9-M91, Spandrel Glass.
 - .8 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.
 - .9 CAN/CGSB-12.11-M90, Wired Safety Glass.
 - .10 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets.
 - .4 Canadian Standards Association (CSA International).
 - .1 CSA A440.2-98, Energy Performance Evaluation of Windows and Sliding Glass Doors.
 - .2 CSA Certification Program for Windows and Doors 2000.
 - .5 Environmental Choice Program (ECP).
 - .1 CCD-045-95(R2005), Sealants and Caulking.
 - .6 Glass Association of North American (GANA)
 - .1 GANA Glazing Manual - 2008.

- .2 GANA Laminated Glazing Reference Manual - 2009.
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- 1.3 SYSTEM DESCRIPTION
 - .1 Performance Requirements:
 - .1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
 - .1 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 meet requirements of Ontario Building Code and as measured in accordance with ANSI/ASTM E330.
 - .3 Limit glass deflection to 1/200 flexural limit of glass with full recovery of glazing materials.
 - .4 Design all fixed glazed panels within dwelling units that extend to less than 1m from the floor to withstand the lateral design loads for balcony guards in Part 4 of the Ontario Building Code. Windows shall be designed to comply with Article 4.1.5.14 of the O.B.C.
 - .2 Conform to applicable criteria in Sections 08 11 00 Hollow Metal Doors & Frames and 08 11 16 Aluminum Doors and Frames, and Section 08 ?? ?? Aluminum Clad Wood Windows.
 - .3 Use only galvanized materials whose compatibility with insulating units has been confirmed in writing by insulating unit management.
 - 1.4 SUBMITTALS
 - .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
 - .1 For glazing materials during application and curing.
 - .3 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.
 - .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit drawings stamped and signed by professional

engineer registered or licensed in Province of Ontario, Canada.

- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 300 mm x 300 mm size samples of each type of glass.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .7 Closeout Submittals:
 - .1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .1 Provide testing of glass under provisions of Section 01 45 00 - Quality Control.
 - .2 Provide shop inspection and testing for glass.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up to including glass glazing, and perimeter air barrier and vapour retarder seal.
 - .3 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
 - .4 Locate where directed where indicated.
 - .5 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 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, labeled 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 strippable coating.
 - .4 Replace defective or damaged materials with new.

1.7 SITE CONDITIONS

- .1 Environmental 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.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Divert metal cut-offs from landfill by disposal into on-site Metal recycling bin.
- .3 Divert uninstalled materials for reuse at nearest used building materials facility or similar type facility.
- .4 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.
- .5 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .6 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .7 Dispose of corrugated cardboard, polystyrene, plastic, packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

- 1.9 WARRANTY
- .1 Provide manufacturer's warranty for sealed glazed units and spandrel glass in accordance with General Conditions (GC) GC12.3 but for five (5) years.
 - .2 Warrant sealed units against failure of perimeter seals of enclosed spaces and deposits on inner face of glass.
 - .3 Warrant spandrel glass panel coating will not delaminate or deteriorate in colour or finish.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Float glass: to CAN/CGSB-12.3, Glazing quality, of thickness indicated.
 - .2 Safety glass :to CAN/CGSB-12.1, transparent, 6 mm thick.
 - .1 Type GL-2 - Tempered.
 - .2 Class B-Float.
 - .3 Category 1
 - .4 Edge treatment: flat ground
 - .3 Silvered mirror glass: thickness to suit size of panel, 5mm minimum thickness.
 - .1 Type 1B-Float glass for high humidity use, unframed, polished edges, provide mirrors for interior of suites as shown on the drawings.
 - .2 Size of mirrors to suit layout of bathrooms.
 - .3 Size of mirrors in common areas and amenity spaces to suit layout indicated on drawings.
 - .4 Wired glass (Type GL-3): to CAN/CGSB-12.11, 6 mm thick.
 - .1 Type 1-Polished both sides (transparent).
 - .2 Wire mesh styles 3-Square.
 - .7 Low emissivity (LOW E) glass, 6 mm thick. At Links (noted as Solar Reflective Glass on Window Schedule).
 - .1 Metallic coating: soft, sputtered.
 - .2 Light transmittance: 70%.
 - .3 Shading co-efficient: 0.36.
 - .4 U-Value: winter 0.29 maximum.
- 2.2 MATERIALS:
SEALED INSULATING
GLASS
- .1 Insulating glass units to CAN/CGSB-12.8, double unit, 25 mm overall thickness. (GL-1).
 - .1 Glass: to CAN/CGSB-12.3 outer glass, PPG Solarban 67 Low-E(2), inner glass 6mm clear.
 - .2 Glass thickness: 6 mm each light.

- .3 Inter-cavity space thickness: 12.5 mm with low conductivity spacers thermal edge space black.
- .4 Glass coating: surface number 2, low "E".
- .5 Inert gas fill: argon.
- .6 Performance:
 - .1 Visible transmittance: 54%
 - .2 Ext. reflectance: 19%
 - .3 Interior reflectance: 16%
 - .4 Winter U Value: 0.24
 - .5 Solar heat gain coefficient: 0.29
 - .6 Light to solar gain: 1.86

2.3 MATERIALS

- .1 Sealant: multi-component, chemical curing to CAN 2-19.24, Type 2 Class A, compatible with sealed units.

2.4 ACCESSORIES

- .1 Setting blocks: Neoprene, EPDM, Silicone, 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 to suit glazing method, glass light weight and area.
- .2 Spacer shims: Neoprene Silicone, 50-60 Shore A durometer hardness to ASTM D 2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
 - .1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper, black colour.
- .4 Glazing splines: resilient polyvinyl chloride or silicone, extruded shape to suit glazing channel retaining slot, colour as selected by Consultant.
- .5 Glazing clips: manufacturer's standard type.
- .6 Lock-strip gaskets: to ASTM C 542.
- .7 Mirror attachment accessories:
 - .1 Stainless steel clips.

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 EXAMINATION
- .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.
- 3.3 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.
 - .4 Coordinate with Section 08 71 00 for glass door and glass wall hardware. Templates to be provide by Section 08 71 00 for hardware to be installed to glass panels. Cut glass to accommodate specified hardware.
- 3.4 INSTALLATION:
EXTERIOR WET/DRY
METHOD (PREFORMED
TAPE AND SEALANT)
- .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, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
 - .3 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
 - .4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners. Ensure support of both planes of glass. Do not block drainage cavities.
 - .5 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
 - .6 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line. Place glazing tape on glazing light or unit with tape flush with 16 mm below sight line.
 - .7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
 - .8 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe

sealant surface smooth.

- .9 Install pressure plates with gaskets or glazing tape as required. Ensure proper alignment of weep holes for drainage at base of glass unit. Ensure proper compression of gaskets or glazing tape. Seal ends of abutting pressure plates.
- .10 Install snap caps. Ensure proper alignment of weep holes for drainage from underside of cap.

3.5 INSTALLATION:
EXTERIOR - WET
METHOD (SEALANT AND
SEALANT)

- .1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.
- .2 Place setting blocks at 1/4 points and with edge block maximum 150 mm from corners. Ensure support of both planes of glass. Do not block drainage cavities.
- .3 Install removable stops with glazing centred in space by inserting spacer shims both sides at 600 mm intervals, 6 mm below sight line.
- .4 Fill gaps between glazing and stops with sealant to depth of bite on glazing, maximum 9 mm below sight line to ensure full contact with glazing and continue air and vapour seal.
- .5 Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 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 1/4 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.
- 3.7 INSTALLATION:
INTERIOR WET/DRY
METHOD (TAPE AND
SEALANT)
- .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 install against permanent stops, projecting 1.6 mm above sight line.
- .3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of light or unit.
- .5 Install removable stops, with spacer shims inserted between glazing and applied stops at 600 mm intervals, 6 mm below sight line.
- .6 Fill gaps between light and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.
- .7 Trim protruding tape edge.
- 3.8 INSTALLATION:
INTERIOR - WET
METHOD COMPOUND AND
COMPOUND
- .1 Install glazing resting on setting blocks. Install applied stop and centre light by use of spacer shims at 600 mm centres, 6 mm below sight line.
- .2 Locate and secure glazing light using spring wire clips glazers' clips.
- .3 Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.
- 3.9 INSTALLATION:
MIRRORS
- .1 Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions.
- .2 Set mirrors with clips. Anchor rigidly to wall construction.
- .3 Set in frame.
- .4 Place plumb and level.
- 3.10 CLEANING
- .1 Perform cleaning after installation to remove construction and

accumulated environmental dirt.

- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.
- .6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.11 PROTECTION OF
FINISHED WORK

- .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.
 - .1 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 SECTION INCLUDES

- .1 The work of this Section includes all labour, materials, equipment and tools required to provide a complete project for the following scope of work as indicated on the Contract Documents:
- .2 Louvres and vents to be installed in windows, doors and curtainwall framing are part of this to be supplied and installed by Section 08 44 13 and 08 50 00. Refer to architectural and mechanical drawings
- .3 Louvres and vents connected to mechanical systems which are not located in glazing windows and curtain wall are part of this Section's scope of work to be supplied and installed by this Section. Refer to mechanical drawings

1.2 RELATED SECTIONS

- .1 Mechanical drawings

1.3 REFERENCES

- .1 The Aluminum Association Inc. (AAI)
 - .1 AAI DAF-45-03(R2009), Designation System for Aluminum Finishes - 9th Edition.
- .2 Air Movement and Control Association International (AMCA)
 - .1 AMCA 500-D-98, Laboratory Methods of Testing Dampers for Rating.
 - .2 AMCA 500-L-99, Laboratory Methods of Testing Louvers for Rating.
 - .3 AMCA 501-03, Application Manual for Air Louvers.
 - .4 AMCA 511-99(R2004), Certified Ratings Program for Air Control Devices.
- .3 American National Standards Institute (ANSI)
 - .1 ANSI H35.1/H35.1M-06, Alloy and Temper Designation Systems for Aluminum.
- .4 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 167-99(2004), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A 653/A 653 M-05a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM A 1008/A 1008M-05b, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength

Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake Hardenable.

.4 ASTM B 32-04, Standard Specification for Solder Metal.

.5 ASTM B 209-04, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.6 ASTM B 221-05a, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.7 ASTM D 523-89(1999), Standard Test Method for Specular Gloss.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.213-2004, Etch Primer (Pretreatment Coating of Tie Coat) for Steel and Aluminum.

.2 CAN2-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

1.4 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS MSDS - Material Safety Data Sheets

.3 Shop Drawings:

.1 Submit drawings incorporated into window and curtainwall shop drawings.

.2 Indicate fabrication and erection details, including anchorage, accessories, and finishes.

.4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures and.

.5 Closeout Submittals:

.1 Provide operation and maintenance data for manual or motorized operated louvres for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

.2 Deliver, store and handle materials in accordance with

- manufacturer's written instructions.
- .3 Deliver materials to the site in undamaged condition.
- .2 Storage and Protection:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Protect louvres from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Weather resistant louvres, with bird screens made to withstand a wind load of not less than 1.44 kilopascals.
- .2 Ratings to indicate water penetration of 0.06 kilograms or less per square meter of free area at free velocity of 244 meters per minute.
- .3 Aluminum extrusions: to AA 6063-T5.
- .4 Nails and fasteners: same material as fabricated items.
- .5 Gaskets: vinyl.
- .6 Screens:
 - .1 bird screens: 0.3 mm diameter aluminum wire 12mm x 12mm mesh, secured to aluminum frame.
- .7 Galvanized steel sheet: commercial quality to ASTM A 653/A 653M with Z275 zinc coating.
- .8 Extruded aluminum louvers at roof parapet walls:
 - .1 Construct louvers from aluminum extrusions of minimum 3 mm thickness to sizes and shapes indicated. Total depth of louver to be 40mm to fit within wall assembly.
 - .2 Arrange blades, mullions and frame extrusions as indicated.
 - .3 Install concealed vertical stiffeners spaced to meet required loads.
 - .4 Complete louver assembly to have 50 % free area.
 - .5 Acceptable product: Cometal or Kanaire, 40mm depth.
 - .6 Finish to match adjacent vinyl siding colour.

- .9 Extruded aluminum louvers not within curtain wall and windows: Refer to Mechanical Drawings
 - .1 Construct louvers from aluminum extrusions of minimum 3 mm thickness to sizes and shapes indicated. Total depth of louver to be 101mm.
 - .2 Arrange blades, mullions and frame extrusions as indicated.
 - .3 Install concealed vertical stiffeners spaced to meet required loads.
 - .4 Complete louvre assembly to have 50 % free area.
 - .5 Provide blank-off panels behind louvers at non-active portions of louvers.
 - .6 Secure louver framing and stiffeners to steel support framing.
 - .7 Provide aluminum sill below louvers to direct water to the exterior of the building envelope.
 - .8 Finish: Colour to match adjacent cladding material colour. Architect to provide colour to be matched.

- .10 Brick vents:
 - .1 Construct brick vents from aluminum extrusions minimum 3 mm thick with 6 mm structural ribs: sizes of brick vents to suit exhaust box sizes as indicated. Refer to Mechanical Drawings
 - .2 Attach bird screen to interior face of vent.
 - .3 Provide weepholes at 125 mm on centre.
 - .4 Apply protective masking cover on exposed surfaces before shipping.
 - .5 Finish: Colour to match adjacent cladding material colour. Architect to provide colour to be matched.

- .11 Kitchen and Laundry Exhaust Vents:
 - .1 Dryer Exhaust Vent: Seiho SFB 4PH clear anodized aluminum dryer vent cap. With backdraft damper, a rigid 8.5" long tail piece and cap cover.
 - .2 Kitchen Range Hood Exhaust Vent: Seiho SFX 6SN stainless steel exterior vent cap. Polished. With insect screen. 152mm size.

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

- .1 Install Louvers where indicated.
- .2 Provide blank off panels for louver areas outside mechanical

ductwork connections. Colour: match louver colour.

- .3 Attach bird screen to inside face of louver or vent.
- .4 Repair damage to Louvers to match original finish.
- .5 Install wall louvers using strap anchors and jamb fasteners as appropriate for wall construction and in accordance with manufacturer's recommendations.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.4 PROTECTION

- .1 Where aluminum contacts metal other than zinc, paint dissimilar metal with primer and two coats of aluminum paint.
- .2 Paint metal in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

END OF SECTION

1.0 ROOM FINISH SCHEDULE INDEX

Room Finish Schedule 09 00 01

2.0 GENERAL NOTES

- .1 Ceiling heights given Above Finished Floor (AFF) unless noted otherwise.
- .2 All steel brackets and covers to be painted.
- .3 Heating units supplied primed for paint to be finished to match wall finish on which they occur.
- .4 Closets to have same finish as room in which they occur.
- .5 All exposed piping, ductwork, conduit and equipment outside of mechanical and electrical service rooms to be painted.
- .6 All gas piping (exposed and concealed) to be painted.
- .7 All surfaces visible through ceiling openings to be painted out. Refer to room schedule for same as wall colour or painted noted accent colour. To be confirmed.
- .8 All wood millwork such as handrails, wood ceiling panels are to be pre-finished by Section 06 40 00. All site applied finish carpentry to be stained unless otherwise noted. Refer to Section 09 91 23 for finishing formulas.
- .9 Paint all exposed steel supports, framing and connectors of millwork to match adjacent finish unless otherwise noted.
- .10 All mounting boards and backing furring/studs for electrical equipment to be painted with two coats of fire retardant paint.
- .11 Paint fire extinguisher cabinets to match adjacent wall colour unless stainless steel.
- .12 All steel stairs, railings, trim brackets, access ladders, manhole covers and sump pit covers to be painted
- .13 All discrepancies between documents and drawings are to be reported to the Architect.
- .14 Grout lines width are 3mm wide. Align grout lines with wall and floor grout lines.
- .15 Paint in Wet Areas to have anti-mildew additive. Rooms such as washrooms, kitchens and janitor rooms.

3.0 MATERIAL CODES

WALLS

BV	Brick Veneer
CONC	Reinforced Poured Concrete
Conc. Block	Concrete Block – see Section 04 22 00
Drywall	Gypsum Board – see Section 09 21 16
Paint	Precast Concrete – see Section 03 45 00
PT_	Paint finish – see Section 09 91 23

CEILINGS

Drywall	Gypsum Board – see Section 09 21 16
Paint_	Paint Finish – see Section 09 91 23
Lay-in-tile	Suspended Grid and Acoustical Ceiling Tile– see Sections 09 51 13 & 09 53 00

FLOORING

WL Vinyl Wood Look Vinyl Tile Flooring – see specification 09 65 19
Carpet Carpet – see specification 09 68 13
PT_ Paint finish – see Section 09 91 23
VCT Vinyl Composite Tile – See section 09 65 16

BASE

Vinyl Resilient Base and Transitions – see Specification 09 65 16

END SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 The work of this Section includes all labour, materials, equipment, and tools required to complete the following list of work as identified on the Contract Documents.
 - .1 Interior gypsum board wall assemblies.
 - .2 Interior gypsum board ceiling assemblies.
 - .3 Interior shaft wall assemblies.
 - .4 Plaster finish to interior wall assemblies over gypsum board, concrete, and concrete block.
 - .5 Acoustic caulking to gypsum board assemblies.
 - .6 Exterior sheathing to exterior wood stud walls.
 - .7 Installation of access panels and doors supplied by Division 21, 22, 23, 25, and 26.
- .2 Work by the same contractor specified in other sections includes all labour, materials, equipment, and tools required to complete the following list of work as identified on the Contract Documents.
 - .1 Sheet metal or wood blocking within wood stud wall framing for anchoring of millwork, cabinets, grab bars, handrails, etc.
 - .2 Wood blocking at all exterior window and door frames in metal stud walls.
 - .3 Gypsum board installation over existing steel stud wall assemblies. (Exterior walls at Links)
 - .4 Non-load bearing steel stud wall framing.
 - .5 Suspended steel stud framing for suspended interior ceilings and bulkheads.
 - .6 Steel stud furring channel assemblies.
 - .7 Acoustic batt insulation within wall and ceiling assemblies.
 - .8 Lay-in tile ceiling panels and suspension systems.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 - Rough Carpentry
- .2 Section 07 21 16 - Blanket Insulation

1.3 REFERENCES

- .1 Aluminum Association
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C 475-02(R2007), Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.
 - .3 ASTM C 954-07, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster

Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.4 ASTM C 1002-07, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.5 ASTM C 1047-09, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.6 ASTM C 1280-99, Specification for Application of Gypsum Sheathing Board.

.7 ASTM C 1177 / C 1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.8 ASTM C 1178/C 1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.9 ASTM C 1396/C 1396M-09a, Standard Specification for Gypsum Wallboard.

.3 Association of the Wall and Ceilings Industries International (AWCI)

.1 AWCI Levels of Gypsum Board Finish-97.

.4 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.

.5 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102-07, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

.6 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.

1.4 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 gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

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 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .3 Storage and Handling Requirements:
 - .1 Store gypsum board assembly 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 of strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
 - .6 Replace defective or damaged materials with new

1.6 SITE
ENVIRONMENTAL
REQUIREMENTS

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.7 MOCK-UP

- .1 Prepare 6 meter long, full height corridor finish mock-up for review prior to proceeding with work of this Section.
- .2 Prepare a mockup of typical gypsum board wall finish to interior frame of exterior windows for review. Reviewed suite shall become standard of acceptance for balance of work.

1.7 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

- .3 Collect and separate for disposal; paper, plastic, polystyrene, and corrugated cardboard packaging material in appropriate on-site containers for recycling in accordance with Waste Management Plan.
- .4 Divert unused gypsum from landfill to gypsum recycling facility for disposal approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused wood materials from landfill to recycling composting facility approved by Consultant.
- .7 Divert unused paint and caulking material from landfill to official hazardous material collections site approved by Consultant.
- .8 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Gypsum board materials must comply with Canadian Recognized tested assemblies for fire resistance and acoustic performance noted. Supplier of materials must provide confirmation that products and total assemblies meet performance requirements.
- .2 Materials shall be from regional sources where possible, within 800 km by truck or 2400 km shipped by rail or water.
- .3 Standard board: to ASTM C 36/C 36M regular, 12.7mm and 15.9 mm thick, and Type X 1200 mm wide x maximum practical length, ends square cut, edges bevelled, 4% post consumer recycled content, 94% post industrial recycled content, and 100% recycled face paper.
 - .1 CGC Sheetrock TGD
 - .2 Certainteed Proroc
- .4 Water mould resistant board:
 - .1 At walls in washrooms and janitor's rooms.
 - .2 Complete system as per manufacturer's specifications.
 - .3 Thickness: 12.7mm and 15.9mm
 - .4 Regular and Type X
 - .5 Acceptable Materials:
 - .1 CGC Sheetrock Mold Tough

- .2 Certainteed M2Tech Water-Mould resistant
- .5 Exterior glass mat gypsum substrate sheathing: to ASTM C 1177/C 1177M, 12.7 & 15.9mm thick, 1200 mm wide x maximum practical length. Type X where indicated.
 - .1 Acceptable Materials:
 - .1 CGC Securock Glass Mat sheathing
 - .2 Certainteed Glasroc
 - .3 Georgia Pacific Dens Glass Gold
- .7 Shaftwall Panels: to ASTM C442, 610mm wide x 25 mm thick panels , lengths to suit application, fire and moisture resistant, bevelled edges for installation in tested C-H stud assemblies.
 - .1 Acceptable Materials:
 - .1 CGC Sheetrock Gypsum Liner
 - .2 Certainteed Proroc Shaftliner
- .9 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30, galvanized.
- .10 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .11 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .12 Nails: to ASTM C 514.
- .13 Steel drill screws: to ASTM C 1002.
- .14 Laminating compound: as recommended by manufacturer, asbestos-free.
- .15 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, zinc-coated by electrolytic process, 0.5 mm base thickness, perforated flanges, one piece length per location.
- .16 Sealants: in accordance with Section 07 92 00 - Joint Sealing.
- .17 Acoustic sealant: Tremco Acoustic Sealant or equal, Refer to Section 07 92 00
- .18 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .19 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .20 Joint compound: to ASTM C 475, asbestos-free.

- .21 Neoprene two sided tape gaskets: white neoprene gasket at window frame junctions.

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

3.2 ERECTION

- .1 Do application and finishing of gypsum board in accordance with ASTM C 840 except where specified otherwise.
- .2 Do application of gypsum sheathing in accordance with ASTM C 1280.
- .3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C 840 except where specified otherwise.
- .4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .5 Install work level to tolerance of 1:1200.
- .6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, and other access locations including valves, access doors and fire dampers.
- .7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
- .8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .10 Install wall furring for gypsum board wall finishes in accordance with ASTM C 840, except where specified otherwise.

- .11 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .13 Erect drywall resilient furring transversely across studs and joists, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.
- .14 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.
- .15 At gypsum board returns to window frames provide and install shims to window blocking between window anchor plates to allow installation of gypsum board over and clear of projecting window anchors. Coordinate work with window contractor.

3.3 APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.
- .2 Apply single and double layer gypsum board to wood and metal furring or framing using screw fasteners for first layer, screw fasteners for second layer. Maximum spacing of screws 300 mm on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C 840.
 - .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
 - .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .3 Apply single and double layer gypsum board to concrete concrete block surfaces, where indicated.

- .1 Comply with gypsum board manufacturer's recommendations.
- .4 Exterior Soffits and Ceilings: Install exterior gypsum board perpendicular to supports; stagger end joints over supports. Install with 6 mm gap where boards abut other work.
- .5 Apply water-resistant gypsum board in all washrooms and bathrooms and adjacent to slop sinks in janitors closets . Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads.
- .6 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts,, in partitions where perimeter sealed with acoustic sealant. Refer to acoustic notes on drawings related to additional requirements.
- .7 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .8 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .9 Install gypsum board with face side out.
- .10 Do not install damaged or damp boards.
- .11 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.
- .12 Install tile backer board to all walls specified to receive ceramic tile finish.
- .13 At all exterior window frame jambs and heads, return gypsum board into window frame. Apply two sided white neoprene tape to back of window frame to act as separator between gypsum board and window frame. Finish gypsum board with exposed white "J" moulding exposing edge of white neoprene tape.
Or
Nova Trim adjustable and removable J protection trim model 8131
Construct mock-up for review and approval prior to proceeding with general work.

3.4 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting window and exterior door frames, to provide thermal break. Use 2mm thick black foam tape, leaving tape edge exposed as a break between window and door frames and gypsum board casing bead.
- .5 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .6 Provide continuous polyethylene dust barrier behind and across control joints.
- .7 Locate control joints where indicated at changes in substrate construction at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.
- .8 Install control joints straight and true.
- .9 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.
- .10 Install expansion joint straight and true.
- .11 Splice corners and intersections together and secure to each member with 3 screws.
- .12 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .13 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .14 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended

Specification on Levels of Gypsum Board Finish:

- .1 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable. Locations: plenum areas above ceilings.
- .2 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable. Locations: panels to be covered with ceramic tile finish.
- .3 Level 3: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges. Locations which are to receive coving plaster finish.
- .4 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges. Locations: standard for all locations unless noted.
- .15 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .16 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .17 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .18 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .19 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
- .20 Mix joint compound slightly thinner than for joint taping.
- .21 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.
- .22 Allow skim coat to dry completely.
- .23 Remove ridges by light sanding or wiping with damp cloth.
- .24 Provide protection that ensures gypsum drywall work will

remain without damage or deterioration at time of substantial completion.

3.5 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.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

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

END OF SECTION

1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and application of acoustical units for installation within a suspended ceiling.

- .2 Related Sections:
 - .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 78 00 - Closeout Submittals.
 - .3 Section 09 00 00 - Room Finish Legend
 - .4 Section 09 53 00 - Acoustical Suspension: Suspension system.
 - .5 Drawing A9.01 – Room Finish Schedule
 - .6 Mechanical Drawings: Mechanical
 - .7 Electrical Drawings: Electrical

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-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.

- .3 Canadian Standards Association (CSA International)

- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

- .5 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate full size samples of each type of acoustical units.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Mock-up:
 - .1 Construct mock-up 10 m² minimum of each type acoustical panel tile ceiling including one inside corner and one outside corner.
 - .3 Construct mock-up where directed.
 - .4 Allow 48 hours for inspection of mock-up by Owner/Client and Consultant before proceeding with ceiling work.
 - .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.
- .3 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with all provincial and local Safety Requirements.

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 Consultant.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
 - .4 Separate for reuse and recycling and place in designated containers Steel, Metal and Plastic waste in accordance with Waste Management Plan.
 - .5 Ensure emptied containers are sealed and stored safely.
 - .6 Fold up metal and plastic banding, flatten and place in designated area for recycling.

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 5% of gross ceiling area for each pattern and type required for project.
 - .3 Ensure extra materials are from same production run as installed materials.
 - .4 Clearly identify each type of acoustic unit, including colour and texture.
 - .5 Deliver to Owner, upon completion of the work of this section.

2 Products

2.1 MATERIALS

- .1 Acoustic Panels for suspended ceiling system: to ASTM E 1264.
- .2 Acoustic Panel: T1 For use in dry areas
 - .1 ASTM E 1264 Type III, Form 2, Pattern CE
 - .2 ASTM E84 Surface burning characteristics Class A, flame spread 25, smoke developed 10.
 - .3 Cellulose fibre with minimum 40% recycled content.
 - .4 Pattern E, G, Class A
 - .5 Noise Reduction Coefficient (NRC) designation of 50.
 - .6 Ceiling Attenuation Class (CAC) rating 35, in accordance with ASTM E 1264
 - .7 Light Reflectance (LR) 0.86 to ASTM E 1477.
 - .8 Edge type SQ edge.
 - .9 Colour white.
 - .10 Size 610 x 610 x 16 mm thick and 610 x 1220 x 16 mm thick. Refer to reflected ceiling plans.
 - .11 Shape flat.
 - .12 Acceptable product: CGC Pebbled ClimaPlus (# 4801 & # 4800) or Georgian # 796 and # 795 by Armstrong.
 - .13 Metric weight 4.20 – 5.76 kg/m² (class A)
 - .14 Imperial weight .86 – 1.18 lb/ft² (class A)

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.

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

1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 09 00 00 - Room Finish Legend.
- .4 Section 09 51 13 - Acoustical Ceiling Panel.
- .5 Drawing A9.01 – Room Finish Schedule
- .6 Mechanical Drawings: Mechanical
- .7 Electrical Drawings: Electrical

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 635-04, 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-06, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 DESIGN REQUIREMENTS

- .1 Maximum deflection: 1/360th of span to ASTM C 635 deflection test.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Submit reflected ceiling plans for special grid patterns as indicated.
 - .3 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines change in level details, access door dimensions, and locations and acoustical unit support at ceiling fixture lateral bracing and accessories.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit one representative model of each type ceiling suspension system.
 - .2 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's recommendations.

- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.

2 Products

2.2 MATERIALS

- .1 Heavy duty system to ASTM C 635.
- .2 Basic materials for suspension system: commercial quality cold rolled steel zinc coated.
- .3 Recycled Content: 65%
- .4 G1 Suspension system: For use in dry areas. To be non fire rated, made up as follows:
 - .1 Two directional exposed tee bar grid.
 - .2 G1 is to be suitable for imperial 2' x 2' system
 - .3 Acceptable Product: CGC Donn DX or Chicago Metallic 1250 System or Prelude XL Fireguard by Armstrong
 - .4 Colour: white
- .5 Exposed tee bar grid components: shop painted satin sheen white colour. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
- .6 Hanger wire: galvanized soft annealed steel wire:
 - .1 3.6 mm diameter for access tile ceilings.
- .7 Hanger inserts: purpose made.
- .8 Carrying channels: 38 x 19 mm channel, of 1.2 mm thick galvanized steel.
- .9 Accessories: splices, clips, wire ties, retainers and wall moulding reveal, to complement suspension system components, as recommended by system manufacturer.

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

- .1 Installation: in accordance with ASTM C 636 except where specified otherwise.
- .2 Install suspension system to manufacturer's instructions

- .3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.
- .4 Secure hangers to overhead structure using attachment methods as indicated in Engineers shop drawings.
- .5 Install hangers spaced at maximum 1220 mm centres and within 150 mm from ends of main tees.
- .6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width system according to reflected ceiling plan.
- .7 Ensure suspension system is co-ordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures diffusers grilles and speakers.
- .10 Support light fixtures/diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .12 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .13 Where recessed light fixtures are installed within the outside edge of the ceiling grid, coordinate clearance requirements with Electrical Contractor using actual light fixture.

3.3 CLEANING

- .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

END OF SECTION

PART 1 - GENERAL

**1.1 RELATED
REQUIREMENTS**

- .1 Section 09 68 13 - Tile Carpet
- .2 Finish Schedule (Drawing A9.01)

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .2 American Society for Testing & Materials (ASTM)
 - .1 ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
 - .2 ASTM E662, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - .3 ASTM F710, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - .4 ASTM F 970, Standard Test Method for Static Load Limit.
 - .5 ASTM F1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring.
 - .6 ASTM F1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - .7 ASTM F1303, Standard Specification for Sheet Vinyl Floor Covering with Backing.
 - .8 ASTM F2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- .3 ASTM F3041-14, Bonded Rubber Crumb Flooring Coverings – Type I & II, Class A, B, C & D
- .4 Resilient Floor Covering Institute (RFCI)
 - .1 RFCI Standard Slab Moisture Test Method (Calcium Chloride Method).
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102.2, Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.
- .6 Flooring Manufactures Installation Guide
- .7 Flooring Manufactures Care Guide
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .9 South Coast Air Quality Management District (SCAQMD),

California State

.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 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 Submit duplicate tile in size specified, 300 mm long base, feature strips, and transition profiles to other finishes. Stainless steel.
- .4 Closeout Submittals:
 - .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 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.
- .2 All floor covering materials on site must be adequately conditioned prior to and after installation to avoid potential expansion or contraction problems.
- .3 Consult other trades in advance and make provisions for work of other trades so as to avoid future repairs.
- .4 Avoid static loads, rolling loads and heavy foot traffic on newly installed floor covering until adhesive has thoroughly set.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 -

Closeout Submittals.

- .2 Provide 6 sq.m. of each colour and pattern of LVT required for this project for maintenance use.
- .3 Provide 3 meters of vinyl base of each colour required for this project for maintenance use.
- .4 Extra materials from same production run as installed materials.
- .5 Identify each container of floor tile and each container of adhesive.
- .6 Deliver to Owner, upon completion of the work of this section.
- .7 Store where directed by Owner.

1.7 QUALITY ASSURANCE

- .1 Installer Qualifications: Experienced in performing the work of this section and who is specialized in the installation of work similar to that required for this project.
 - .1 Training: Installer who has attended a Manufacturer's flooring installation training clinic.
 - .2 Mock-ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish colour texture and pattern and workmanship standards.
 - .1 Mock-up Size: 3m x 3m
 - .2 Maintenance: Maintain mock-up during construction for workmanship comparison.
 - .3 Incorporation: Mock-up may be incorporated into final construction upon Owner's approval.

1.8 WARRANTY

- .1 Project Warranty: Refer to CCDC 2 for project warranty provisions.
- .2 Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official in accordance with Section 01 78 00 Closeout Submittals. Manufacturer's warranty is in addition to and not a limitation of other rights that the Owner may have under the Contract Conditions.
- .3 Warranty period on material shall be extended from one year to ten years.
- .4 Warranty shall specifically guarantee against defects and wear, of pattern, colour and delamination.
- .5 Warranty period on labour shall be extended from one year to two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Luxury Vinyl Tile Flooring – Tandus Centiva Resolve.
 - .1 Classification: ASTM F1700 Class III Type B
 - .2 Total thickness: 2.5mm
 - .3 Wear layer thickness: 0.5mm
 - .4 Finish: Polyurethane reinforced
 - .5 Edge treatment: Square
 - .6 Emboss: Standard
 - .7 Colour: To be selected from full range of 10 colours.
- .2 Primer and Patch: 2 part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product. Feather floor areas as required to ensure minimum transition height between floor finishes as noted on drawings. Allow for two coats. Standard of Acceptance: HB Fuller TA 320 Perfect Finish
- .5 Floor patch and leveller TEC Primer TA560 and TEC Levelling TA323 “No substitute” where vinyl flooring is being applied where substrate requires a self levelling material.
- .6 Tarkett RollSmart Adhesive:
Coverage: 350 – 400 sq. per gallon
(3/8" Nap Paint Roller used with a paint tray)
- .7 Transition from LVT to carpet tile – MetalEdge ME-02, colour to be determined.
- .8 Metal edge strips: Schluter aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .9 Transition strips: Schluter stainless steel or aluminum profiles as noted to provide smooth transition between different finish heights.
- .10 Resilient base: Vinyl, standard toe, minimum 2400 mm length and 127mm high x 3mm thick. Refer to drawing A9.01 – Room Finish Schedule for locations.

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 Examine subfloors prior to installation to determine that

surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the finished flooring material.

- .2 Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, and hardening compounds; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mould or mildew.
- .3 Report conditions contrary to contract requirements which would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .4 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- .5 Moisture Testing: Perform calcium chloride moisture test or test method recommended by the flooring manufacturers every 800 square feet of area. Advise Flooring Manufacturer's Technical Representative, Consultant and General Contractor of results.
- .6 The pH level of the subfloor surface shall not be higher than that recommended in flooring manufacturers written documents. If higher, subfloor must be neutralized.
- .7 Underlayment and Patching Compounds: Use only gray colored Portland cement based underlayments; patching compounds are used for filling cracks, holes and leveling. White gypsum materials are not acceptable.
- .8 Perform a bond test for each type of material. Mockup shall incorporate adhesive and tile on the concrete slab to determine compatibility of the system. This shall be performed in advance of the flooring being installed. Photographs of each step taken shall be forwarded to the Manufacturer's representative for review and issuance of a report prior to proceeding with the full installation

3.3 SUB-FLOOR TREATMENT

- .1 Clean floor. Substrate to be free from oil, grease, dust, loose, concrete sealer, floor finishes or curing compound.
- .2 Remove sub-floor ridges and bumps. Surface protrusions shall be removed by sanding, scraping or chipping. After sanding, remove all dust by vacuuming.
- .3 Fill low spots, cracks, joints, holes and other defects with sub-floor filler as per manufacturers recommendations.

- .4 Prohibit traffic until filler cured and dry.
- .5 Prime Seal concrete to flooring manufacturer's printed instructions.

3.4 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 finish flooring, parallel to the exterior wall of the suites (parallel to the main light direction). Flooring shall be installed the same direction throughout a suite.
- .3 Maintain 10 mm expansion space at perimeter of floor surface.
- .4 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .5 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.6 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.

3.7 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.
 - .1 Clean flooring and base surfaces to flooring manufacturer's printed instructions.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility
- .3 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

3.8 PROTECTION

- .1 Protect new floors from damage after initial installation until completion of project. Provide heavy duty craft paper or similar approved protection material taped in place to protect floors to the satisfaction of the General Contractor and Consultant.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Repair damage to adjacent materials caused by flooring installation.

3.9 SCHEDULE

- .1 Refer to Section 09 00 00 and Room Finish Schedule on Drawing A9.01

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS**
- .1 Section 09 00 00 – Interior Finish Material / Colour Legend
 - .2 Section 09 68 13 – Tile Carpet
 - .3 Drawing A9.01 – Room Finish Schedule
- 1.2 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)
 - .1 Material Safety Data Sheets (MSDS).
 - .4 South Coast Air Quality Management District (SCAQMD), California State
 - .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 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 Submit duplicate tile in size specified, 300 mm long base, feature strips, and transition profiles to other finishes. Stainless steel.
 - .4 Closeout Submittals:
 - .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

<u>1.4 DELIVERY, STORAGE AND HANDLING</u>	.1	Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
	.2	Waste Management and Disposal: .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
<u>1.5 ENVIRONMENTAL REQUIREMENTS</u>	.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.
<u>1.6 MAINTENANCE</u>	.1	Extra Materials: .1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals. .2 Provide 3 sq.m. of each colour, 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.
<u>1.7 QUALITY ASSURANCE</u>	.1	Installer Qualifications: Experienced in performing the work of this section and who is specialized in the installation of work similar to that required for this project. .1 Training: Installer who has attended a Manufacturer's flooring installation training clinic. .2 Mock-ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish colour texture and pattern and workmanship standards. .1 Mock-up Size: 3m x 3m .2 Maintenance: Maintain mock-up during construction for workmanship comparison. .3 Incorporation: Mock-up may be incorporated into final construction upon Owner's approval.
<u>1.8 WARRANTY</u>	.1	Project Warranty: Refer to CCDC 2 for project warranty provisions.

- .2 Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official in accordance with Section 01 78 00 Closeout Submittals. Manufacturer's warranty is in addition to and not a limitation of other rights that the Owner may have under the Contract Conditions.
- .3 Warranty period on material shall be extended from one year to five years.
- .4 Warranty shall specifically guarantee against defects and wear, of pattern, colour and delamination.
- .5 Warranty period on labour shall be extended from one year to two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Vinyl composition tile: to ASTM F 1066, Composition 1 - non asbestos Class 1 - solid colour or Class 2 - through pattern tile.
 - .1 Product Manufacturer: Tarkett North America
 - .2 Distributer: Prosol Distribution Inc.
 - .3 Designation: Tarkett VCT
 - .4 Size: 305mm x 305mm, 3.17mm thick.
 - .5 Colour: To be selected from manufacturer's full colour range.
- .2 Resilient base: Thermoplastic Vinyl 1/8", standard toe, minimum 2400 mm length and 101mm high x 3mm thick.
 - .1 Product Manufacturer: Tarkett North America
 - .2 Distributer: Prosol Distribution Inc.
 - .3 Designation: Traditional Vinyl 1/8"
 - .4 Size: 102mm
 - .5 Colour: To be selected from manufacturer's full colour range.
- .3 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
 - .1 Flooring adhesives: compatible with and as recommended by manufacturer.
 - .1 Adhesive: maximum VOC limit 60 g/L to SCAQMD Rule 1168.
 - .2 Standard of Acceptance:
 - a. Tarkett 100 Clear Thin Spread Adhesive
Coverage: Porous Substrate: 250-300 sq. ft./gal.
 - b. Tarkett 975 Two-Part Polyurethane Adhesive

Coverage: Porous & Non-porous Substrate:
225-250 sq. ft. per gallon.

c. Tarkett 901 SpraySmart Adhesive Coverage:
200 sq. ft. per container (1,200 sq. ft. per
carton).

- .2 Cove base adhesives:
 - .1 Adhesive: maximum VOC limit 50 g/L to SCAQMD Rule 1168.
 - .2 Standard of Acceptance: HB Fuller TEC TA714
- .4 Primer and Patch: 2 part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product. Feather floor areas as required to ensure minimum transition height between floor finishes as noted on drawings. Allow for two coats. Standard of Acceptance: HB Fuller TA 320 Perfect Finish
- .5 Floor patch and leveller TEC Primer TA560 and TEC Levelling TA323 "No substitute" where vinyl flooring is being applied where substrate requires a self levelling material.
- .6 Metal edge strips: Schluter aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .7 Transition strips: Schluter stainless steel or aluminum profiles as noted to provide smooth transition between different finish heights.
- .8 Sealer: to CAN/CGSB-25.20, Type 2-water based or type recommended by flooring manufacturer.
 - .1 Sealant: Sealant: maximum VOC limit 50 g/L to SCAQMD Rule 1168.
- .9 Wax: to CAN/CGSB-25.21 or type 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 Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and

other defects that might prevent adhesive bond or impair durability or appearance of the finished flooring material.

- .2 Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, and hardening compounds; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mould or mildew.
- .3 Report conditions contrary to contract requirements which would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .4 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- .5 Moisture Testing: Perform calcium chloride moisture test or test method recommended by the flooring manufacturers every 800 square feet of area. Advise Flooring Manufacturer's Technical Representative, Consultant and General Contractor of results.
- .6 Wood subfloors shall not exceed 10% moisture content when measured with a Delmhorst Wood Moisture Tester.
- .7 The pH level of the subfloor surface shall not be higher than that recommended in flooring manufacturers written documents. If higher, subfloor must be neutralized.
- .8 Underlayment and Patching Compounds: Use only gray colored Portland cement based underlayments; patching compounds are used for filling cracks, holes and leveling. White gypsum materials are not acceptable.
- .9 Perform a bond test for each type of material. Mockup shall incorporate underlayment, adhesive and tile on the concrete slab to determine compatibility of the system. This shall be performed in advance of the flooring being installed. Photographs of each step taken shall be forwarded to the Manufacturer's representative for review and issuance of a report prior to proceeding with the full installation

3.3 SUB-FLOOR TREATMENT

- .1 Clean floor. Substrate to be free from oil, grease, dust, loose, concrete sealer, floor finishes or curing compound.
- .2 Remove sub-floor ridges and bumps. Surface protrusions shall be removed by sanding, scraping or chipping. After sanding, remove all dust by vacuuming.

- .3 Fill low spots, cracks, joints, holes and other defects with sub-floor filler as per manufacturers recommendations.
- .4 Prohibit traffic until filler cured and dry.
- .5 Prime Seal concrete 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.
- .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 with pattern grain parallel for units and parallel to width of room. Refer to drawings for patterns.
- .5 As installation progresses, and after installation, roll flooring in 2 directions including resilient tile with 45 kg minimum roller to ensure full adhesion.
- .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 metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 BASE APPLICATION

- .1 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.
- .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.

3.6 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.

3.7 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. In carpeted areas clean, seal and wax base surface before carpet installation.

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.

3.9 SCHEDULE

- .1 Refer to Drawing A9.01 - Room Finish Schedule for locations.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS**
- .1 Section 09 00 00 – Interior Finishes Material Legend
 - .2 Drawing A9.01 – Room Finish Schedule
- 1.2 REFERENCES**
- .1 American Association of Textile Chemists and Colorists (AATCC)
 - .1 AATCC Test Method 16-2004, Colorfastness to Light.
 - .2 AATCC Test Method 23-2005, Colorfastness to Burn Gas Fumes.
 - .3 AATCC Test Method 129-2005, Colourfastness to Ozone in the Atmosphere Under High Humidities.
 - .4 AATCC Test Method 134-2006, Electrostatic Propensity of Carpets.
 - .5 AATCC Test Method 171-2005, Carpets: Cleaning of; Hot Water Extraction Method.
 - .6 AATCC Test Method 175-2008, Stain Resistance: Pile Floor Coverings.
 - .7 AATCC Test Method 189-2007, Fluorine Content of Carpet Fibers.
 - .2 ASTM International
 - .1 ASTM D 297-93(2006), Standard Test Methods for Rubber Products-Chemical Analysis.
 - .2 ASTM D 1335-05, Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings.
 - .3 ASTM D 1667-05, Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
 - .4 ASTM D 3574-08, Standard Test Methods for Flexible Cellular Materials - Slab, Bonded, and Molded Urethane Foams.
 - .5 ASTM D 3936-05, Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering.
 - .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 22-2004, Textile Test Methods - Colourfastness to Rubbing (Crocking).
 - .2 CAN/CGSB-4.2 No.27.6M-2004, Textile Test Methods - Flame Resistance - Methemine Tablet Test for Textile Floor Coverings.
 - .3 CAN/CGSB-4.2 No. 76-94: , Textile Test Methods - Machine-Made Textile Floor Coverings - Determination of Dimensional Changes Due to the Effects of Varied Water and Heat Conditions.
 - .4 CAN/CGSB-4.2 No.77.1-94/ISO 4919:2000 , Textile Test Methods - Carpets - Determination of Tuft Withdrawal Force.

1.3 ACTION AND
INFORMATIONAL
SUBMITTALS

- .5 CAN/CGSB-4.129-93(R1997), Carpets for Commercial Use.
- .4 Carpet and Rug Institute (CRI)
 - .1 CRI Carpet Installation Standard 2009.
 - .2 CRI Green Label Indoor Air Quality Testing Program.
 - .3 CRI Green Label Plus Indoor Air Quality Testing Program.
- .5 Environmental Choice Program (ECP)
 - .1 CCD-152-2009, Flooring Products, Commercial Non-modular Textile Flooring.
- .6 Health Canada
 - .1 C.R.C., c.923-10, Hazardous Products Act - Carpet Regulations, Part II of Schedule 1.
- .7 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .8 National Floor Covering Association (NFCA)
 - .1 National Floor Covering Specification Manual 2007.
- .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 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 each carpet tile, undercushion ,adhesive, carpet protection, subfloor patching compound and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
 - .1 Information on shop drawings to indicate:
 - .1 Nap: direction, open edges, special patterns.
 - .2 Cutouts: show locations where cutouts are required.
 - .3 Edgings: show location of edge moldings and

edge bindings.

- .4 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit duplicate samples of each type of carpet tile specified and duplicate tiles for each colour selected, 150 mm length binder bars base divider strips.
- .5 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .6 Test and Evaluation Reports:
 - .1 Certified test reports showing compliance with specified performance characteristics and physical properties.
- .7 Manufacturer's Instructions: submit manufacturer's installation and storage instructions.
- .8 Manufacturers Reports:
 - .1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance with specifications.
 - .2 Regional Materials: submit evidence that project incorporates required percentage 10-20% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
 - .3 Low-Emitting Materials:
 - .1 Submit listing of adhesives and coatings used in building, showing compliance with VOC and chemical component limits or restriction requirements.
 - .2 Submit listing of carpet, carpet backer and adhesive used in building, showing compliance with CRI Green Label Indoor Air Quality Test Program.
- .9 Qualification Statements:
 - .1 Compliance: to CAN/ULC-S102 and CAN/ULC-S102.2.
 - .2 Testing: passes testing requirements of:
 - .1 Green Label Plus Indoor Air Quality Testing Program.
 - .3 Tuft bind: meets requirements of CAN/CGSB-4.129 when tested to CAN/CGSB-4.2 No.77.1.

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 installed products for incorporation into manual.
- .3 Warranty Documentation: submit warranty documents .

1.5 MAINTENANCE
MATERIAL SUBMITTALS

- .1 Extra stock materials : deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
 - .1 Quantity: provide minimum 10% of:
 - .1 Carpet tile
 - .2 Adhesives
 - .2 Delivery, storage and protection: comply with Owner's requirements for delivery and storage of extra materials. Provide materials in original cartons.

1.6 QUALITY
ASSURANCE

- .1 Qualifications:
 - .1 Manufacturer: capable of providing field service representation during construction and approving application method.
 - .2 Flooring Contractor:
 - .1 Experienced in performing work of this Section who has specialized in installation of work similar to that required for this project.
 - .2 Certified by carpet manufacturer.
 - .3 Must not sub-contract labour without written approval of Consultant.
 - .4 Responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturer's written instructions.

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, labeled 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 protected from exposure to harmful

weather conditions and at temperature conditions recommended by manufacturer.

.3 Store and protect carpet tile and adhesive in original containers or wrapping with manufacturer's seals and labels intact.

.4 Store and protect carpet tile and accessories in location as directed by Consultant.

.5 Store carpet and adhesive at minimum temperature of 18 degrees C and relative humidity of maximum 65% for minimum of 48 hours before installation.

.6 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.

.7 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.8 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal .

1.8 SITE CONDITIONS

.1 Ambient Conditions:

.1 Moisture: ensure substrate is within moisture limits and alkalinity limits recommended by manufacturer. Prepare moisture testing and provide report.

.2 Temperature: maintain ambient temperature of not less than 18 degrees C from 48 hours before installation to at least 48 hours after completion of work.

.3 Relative humidity: maintain between 10% and 65% for 48 hours before, during and 48 hours after installation.

.4 Ventilation:

.1 Co-ordinate operation of ventilation system during installation of carpet. Ventilate area of work by use of approved portable supply and exhaust fans.

.2 Provide continuous ventilation during and after carpet application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of carpet installation.

.5 Install carpet after space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete.

1.9 WARRANTY

.1 Manufacturer's warranty: submit, for Consultant's acceptance, manufacturer's standard warranty document executed by

authorized company official. Manufacturer's warranty is in addition to and does not limit other rights Owner may have under Contract Documents.

- .2 Warranty period: 2 years labour, 10 year manufacturer material, commencing on date of substantial performance of work.
 - .1 Warranty covers labour and repair or replacement of defective components.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Carpet Tile: Tandus Crosscut Collection – colour to be determined.
- .2 Adhesives: in accordance with manufacturer's recommendations, VOC limit 150 g/L maximum to SCAQMD Rule 1168 GS-36.
- .3 Primer and Sealer: in accordance with manufacturer's recommendations for surface conditions:
 - .1 VOC limit: 100 g/L maximum to SCAQMD Rule 1113

2.2 PERFORMANCE

- .1 Flammability: certified for flammability to Health Canada regulations under "Hazardous Products - Carpet Regulations", Part II of Schedule 1.
- .2 Flame Spread: maximum flame spread rating 300, maximum smoke developed classification 500, when tested to CAN/ULC-S102.2.
- .3 Smoke Development: 450 or less per ASTM E 662.
- .4 Dry Breaking Strength: to ASTM D 2661, minimum acceptable tear strength in both length and width:
 - .1 11.3 kg for carpets installed by glue down installation.
- .5 Wear: maximum 10% of pile face fiber by weight for 10 years.
- .6 Edge Ravel: none for 10 years.
- .7 Static Resistance: permanent static control to AATCC 134, and 3000 V maximum at 20% RH and 22 degrees C.
- .8 Static Generation: less than 3.0 kV per AATCC 134 for 10 years.
- .9 Tuft Bind: Tuft Lock: to CAN/CGSB-4.129, minimum acceptable 1.6 kilograms for cut pile product 3.6 for loop pile product.

- .10 De-lamination of Secondary Backing: Lamination Strength of Secondary Backing: to ASTM D 3936, minimum acceptable peel strength of 1.6 kg/25 mm.
- .11 Stain resistance: to AATCC 175, 8.
- .12 Soil Resistance: 350 ppm fluorine minimum Fluorine Durability Level to AATCC 189.
- .13 Colourfastness to light: to CAN/CGSB-4.2 No.18.3 AATCC 16.
- .14 Colourfastness to atmosphere: to AATCC 129 and AATCC 23.
- .15 Colourfastness to crocking: to CAN/CGSB-4.2 No. 22.
- .16 Indoor Air Quality Certification: certified to CRI Green Label IAQ requirements.

2.3 ACCESSORIES

- .1 Adhesive:
 - .1 Pressure Sensitive Type: recommended by carpet tile manufacturer for direct glue down installation of specified carpet tiles.
 - .2 Mill-applied Adhesive Type: fully cured. Combination of pre-applied adhesive and tile to meet carpet only VOC emissions criteria of Carpet and Rug Institute Green Label Plus Indoor Air Quality Certification Program.
 - .3 Pre-applied Adhesive: non-transferable.
 - .4 On site application VOC limit: 150 g/L maximum to SCAQMD Rule 1168.
 - .5 Adhesive in compliance with CCD-152.
- .3 Transition Mouldings:
 - .1 Carpet edge / reducer strip: Schluter type, stainless steel/brushed.
 - .2 MetalEdge ME-02 – colour to be determined
- .4 Carpet protection: non-staining heavy duty kraft paper.
- .5 Concrete floor sealer or primer: as recommended by carpet tile manufacturer.
 - .1 VOC limit: 100 g/L maximum to SCAQMD Rule 1113.
- .6 Subfloor primer and patching compound: 2 part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product. Feather floor areas as required to ensure minimum transition height between floor finishes as noted on drawings. Allow for two coats. Standard of Acceptance: HB Fuller TA 320 Perfect Finish

- .7 Floor patch and leveler TEC Primer TA560 and TEC Leveling TA323 "No substitute" where carpet tile flooring is being applied where substrate requires a self leveling material.

PART 3 - EXECUTION

3.1 INSTALLERS

- .1 Use experienced and qualified technicians to carry out assembly and installation of tile carpet.

3.2 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section, co-ordinate with Section 01 71 00 - Examination and Preparation.
- .2 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for carpet tile installation in accordance with manufacturer's written instructions.
- .1 Inform Consultant of unacceptable conditions immediately upon discovery.
- .2 Proceed with installation only after unacceptable conditions have been remedied. .

3.3 PREPARATION

- .1 Subfloor Preparation:
- .1 Inspect concrete and determine special care required to make it a suitable for carpet.
- .2 Fill and level cracks 3 mm wide or protrusions over 0.8 mm with appropriate patching compound.
- .3 Comply with manufacturer's written recommendations for maximum patch thickness.
- .4 Prime large patch areas with compatible primer.
- .5 Ensure concrete substrates are cured, clean and dry.
- .6 Ensure concrete substrates are free of paint, dirt, grease, oil, curing or parting agents, and other contaminants, including sealers, that interfere with the bonding of adhesive.
- .7 Where powdery or porous concrete surface is encountered, apply primer compatible with adhesive to provide a suitable surface for glue-down installation.
- .2 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations and co-ordinate with Section 01 71 00 - Examination and Preparation.
- .1 Prepare floor surfaces in accordance with CRI Carpet Installation Standard.
- .3 Tile Carpeting Preparation:
- .1 Pre-condition carpeting: following manufacturer's written instructions.

3.4 INSTALLATION

- .1 Install carpet tiles in accordance with manufacturer's written instructions, and CRI Carpet Installation Standard and co-ordinate with Section 01 73 00 - Execution.
- .2 Co-ordinate tile carpeting work with work of other trades, for proper time and sequence to avoid construction delays.
- .3 Install carpet tile after finishing work is completed but before demountable office partitions and telephone and electrical pedestal outlets are installed.
- .4 Install carpet tile as per manufacturer's recommendation. This can include quarter-turn 90 degree format, monolithic, random, quarter turn ashlar, horizontal, herringbone or vertical ashlar.
- .5 Snugly join carpet tiles in completed installation.
 - .1 Measure distance covered by 11 carpet tiles (10 joints) and ensure distance is in compliance with manufacturer specifications.
 - .2 Do not trap yarn between carpet tiles.
- .6 Ensure finished installation presents smooth wearing surface free from conspicuous seams, burring and other faults.
- .7 Use material from same dye lot.
 - .1 Ensure colour, pattern and texture match within visual areas.
 - .2 Maintain constant pile direction.
- .8 Fit around architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses, and around projections.
- .9 Cut tile and fit neatly around fixed objects.
- .10 Extend carpet tiles into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- .11 Install carpet tiles smooth and free from bubbles, puckers, and other defects.
- .12 Protect exposed carpet tile edges at transition to other flooring materials with suitable transition strips.

3.5 SITE QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Co-ordinate manufacturer's services with Section 01 45 00 - Quality Control. Have manufacturer 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.

.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 Schedule site visits:

.1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

.4 Obtain reports within 3 days of review and submit immediately to Consultant.

3.6 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.

.1 Vacuum carpets clean immediately after completion of installation.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal .

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Prohibit traffic on carpet for period of 24 hours minimum after installation and until adhesive is cured.

.3 Install carpet protection to satisfaction of Consultant.

.4 Repair damage to adjacent materials caused by tile carpeting installation.

3.8 SCHEDULES

.1 Refer to Section 09 00 00 and drawing A9.01 – Room Finish Schedule.

END OF SECTION

PART 1 - GENERAL

**1.1 RELATED
SECTIONS**

- .1 Section 05 50 00 – Metal Fabrications
- .2 Section 08 00 00 – Door Schedule
- .3 Section 08 11 00 – Hollow Metal Doors and Frames
- .4 Section 09 01 23 – Interior Painting

1.2 REFERENCES

- .1 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 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.
- .4 National Fire Code of Canada.
- .5 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications, SSPC Painting Manual 2005.
- .6 South Coast Air Quality Management District (SCAQMO) Rule 1113 – Paint Coatings
- .7 Green Seal Program
 - .1 GS-11 – Paints (1993)
 - .2 GC-03-Anti Corrosive Paints (1997)

**1.3 QUALITY
ASSURANCE**

- .1 Qualifications:
 - .1 Conform to latest MPI requirements for exterior painting work including preparation and priming.
 - .2 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
 - .3 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.
 - .4 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.

- .5 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.

1.4 PERFORMANCE REQUIREMENTS

- .1 Environmental Performance Requirements:
 - .1 Provide paint products meeting MPI "Environmentally Friendly" E1 E2 E3 ratings based on VOC (EPA Method 24) content levels.
 - .2 Green Performance in accordance with MPI Standard GPS-1.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets.
- .3 Upon completion, submit records of products used. List products in relation to finish system and include the following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.
 - .5 Manufacturer's Material Safety Data Sheets (MSDS).
- .4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit duplicate 200 x 300 mm sample panels of each specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.
 - .2 13 mm birch plywood for finishes over wood surfaces.
 - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .4 13 mm gypsum board for finishes over gypsum

board and other smooth surfaces.

.5 38 mm cedar for clear coating over wood surfaces.

.2 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

.3 Submit full range of available colours where colour availability is restricted.

1.6 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.

1.7 DELIVERY, STORAGE AND HANDLING

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

.1 Deliver and store materials in original containers, sealed, with labels intact.

.2 Labels: to indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.

.10 Remove paint materials from storage only in quantities required for same day use.

.11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling

storage, and disposal of hazardous materials.

.12 Fire Safety Requirements:

- .1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.
- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

.2 Waste Management and Disposal:

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .7 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by organizations for verifiable re-use or re-manufacturing.
- .8 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area

at moderate temperature.

1.8 AMBIENT
CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 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.
 - .2 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.
 - .3 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 15 % for wood.
 - .2 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.

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 Paint materials for paint systems: to be products of single manufacturer.
- .3 Only qualified products with E2 E3 "Environmentally Friendly" ratings are acceptable for use on this project.

2.2 COLOURS

- .1 Colours as selected by Interior Designer
- .2 Selection of colours will be from manufacturers full range of colours.
- .3 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 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 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.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

<u>Gloss Level Category/</u>	<u>Units @ 60 Degrees/</u>	<u>Units @ 85 Degrees/</u>
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as specified and as noted on Finish Schedule.

2.5 EXTERIOR PAINTING SYSTEMS

- .1 Asphalt Surfaces: zone/traffic marking for drive and parking areas, etc.
 - .1 EXT 2.1A - Latex zone/traffic marking finish.

- .2 Structural Steel and Metal Fabrications:
 - .1 EXT 5.1G - Pigmented polyurethane finish (over epoxy zinc rich primer and high build epoxy).
- .3 Galvanized Metal: not chromate passivated
 - .1 EXT 5.3D - Pigmented polyurethane finish.
- .4 Woodwork, Painted: EXT 6.3A G5 "Premium Grade" Three Coats (Gloss Level 5).
 - .1 One coat alkyd primer, (MPI#5).
 - .2 Two coats exterior latex (MPI#11).

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 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 wiping with dry, clean cloths.
 - .2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly. 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 Do not apply paint until prepared surfaces have been accepted by Paint Manufacturer's Representative.
- .7 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.

3.3 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 Wood: 15 %.

3.4 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, 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.

3.5 APPLICATION

- .1 Method of application to be as approved by Consultant. Apply paint by brush and roller. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Consultant.
- .4 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

- .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- 3.6 MECHANICAL/ELECTRICAL EQUIPMENT
- .1 Unless otherwise specified, paint 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. Confirm items with Consultant.
- .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 Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.
- 3.7 FIELD QUALITY CONTROL
- .1 Inspection:
.1 Advise Consultant when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
.2 Co-operate with Consultant and provide access to areas of work.
- .2 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.
- 3.8 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.
- 3.9 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.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

3.10 EXTERIOR
PAINTING SCHEDULE

- .1 The following elements required to be finished on site by the work of this section.
 - .1 Exterior stair handrails and galvanized metal guardrails not covered by others.
 - .2 Galvanized garage door frame.
 - .3 Exterior Hollow Metal doors and frames

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Material and installation of site applied paint finishes to new interior surfaces, including site painting of shop primed surfaces.
 - .2 Sustainable requirements for construction and verification:
- .2 Related Sections:
 - .1 Section 06 20 00 – Finished Carpentry
 - .2 Section 06 40 00 – Architectural Woodwork
 - .3 Section 09 21 16 – Gypsum Board Assemblies
 - .4 Section 09 91 13 – Exterior Painting
 - .5 Drawing A9.01 - Room Finish Schedule

1.2 REFERENCES

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2004.
- .5 National Fire Code of Canada - 1995
- .6 Society for Protective Coatings (SSPC)
 - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
- .7 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34 .

1.3 QUALITY
ASSURANCE

- .1 Qualifications:
 - .1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
 - .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.
- .2 Mock-Ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .1 Provide 7.5 sq. m. mock-up. Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
 - .2 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
 - .3 Locate where directed
 - .4 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.
- .3 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting two weeks prior to beginning work of this Section and on-site installations
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .4 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
- .3 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
 - .2 Submit duplicate 200 x 300 mm sample panels of each paint stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.
 - .2 13 mm maple plywood for finishes over wood surfaces.
 - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
 - .4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .1 Lead, cadmium and chromium: presence of and amounts.
 - .2 Mercury: presence of and amounts.
 - .3 Organochlorines and PCBs: presence of and amounts.
 - .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation and application instructions.
 - .7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:

- .1 Product name, type and use.
- .2 Manufacturer's product number.
- .3 Colour numbers.
- .4 MPI Environmentally Friendly classification system rating.

1.5 MAINTENANCE

- .1 Extra Materials:
 - .1 Deliver to owner, extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide 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.
 - .3 Delivery, storage and protection: comply with Consultant requirements for delivery and storage of extra materials.

1.6 DELIVERY,
STORAGE AND
HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to

clean condition.

- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
 - .1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
 - .4 Separate for reuse and recycling and place in designated containers Steel, Metal, and Plastic waste in accordance with Waste Management Plan (WMP).
 - .5 Place materials defined as hazardous or toxic in designated containers.
 - .6 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.
 - .7 Ensure emptied containers are sealed and stored safely.
 - .8 Unused paint coating materials must be disposed of at official hazardous material collections site as approved by Consultant.
 - .9 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
 - .10 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
 - .11 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
 - .12 To reduce the amount of contaminants entering

waterways, sanitary/storm drain systems or into ground follow these procedures:

- .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .13 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .14 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by, or organizations for verifiable re-use or re-manufacturing.

1.7 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
- .1 Provide heating facilities 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.
 - .2 Provide continuous ventilation for seven days after completion of application of paint.
 - .3 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.
 - .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless pre-approved written approval by product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.

- .4 The relative humidity is under 85 % or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
- .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
- .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of 28 days.
 - .2 15 % for wood.
 - .3 12 % for plaster and gypsum board.
- .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "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.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:
 - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single

manufacturer.

- .3 Only qualified products with E2 E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.
- .6 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .7 Provide paint products meeting MPI "Environmentally Friendly", E2& E3 ratings based on VOC (EPA Method 24) content levels.

2.2 COLOURS

- .1 Colour Schedule:
 - .1 Refer to Room Finish Schedule.
 - .2 Final Colours will be indicated on Construction Issued Drawings.
- .2 Selection of colours from manufacturer's full range of colours.
- .3 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .4 Allow for 1 accent colour wall in each room.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.

- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated.

2.5 INTERIOR PAINTING SYSTEMS

- .1 Asphalt surfaces: zone/traffic marking of interior drive and parking areas:
 - .1 INT 2.1A - Latex zone/traffic marking finish.
- .2 Concrete vertical surfaces: including horizontal soffits:
 - .1 INT 3.1E - Latex G4 Premium Grade
 - .2 INT 3.1G - Waterborne epoxy (tile-like) finish for smooth concrete, Premium Grade to be applied in garbage rooms.

- .3 Concrete horizontal surfaces: floors and stairs:
 - .1 INT 3.2B - Alkyd floor enamel low gloss finish for painted concrete floors. Premium grade.
 - .2 INT 3.2G - Concrete floor sealer for floors indicated to receive finish sealer.
 - .3 INT 3.2L - Waterborne epoxy floor finish for floors indicated to receive "EPX" finish premium grade.

- .4 Concrete masonry units: smooth and split face block and brick:
 - .1 INT 4.2D - High performance architectural latex G4 Premium grade finish.
 - .2 INT 4.2K - Waterborne light industrial G5 premium grade to be applied in garbage rooms

- .5 Structural steel and metal fabrications: columns, beams, joists:
 - .1 INT 5.1E Alkyd - G5 premium finish.

- .6 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
 - .1 INT 5.3B - Waterborne light industrial G5 premium coating.

- .7 Dressed lumber: including doors, door and window frames, casings, mouldings:
 - .1 INT 6.3A - High performance architectural latex G5 premium grade finish for painted wood.
 - .2 INT 6.3S - Clear fire retardant finish (ULC rated), for fire treated wood.
 - .3 INT 6.3Z - Clear (2 component) polyurethane finish. Premium grade.

- .8 Wood paneling and casework: partitions, panels, shelving, millwork:
 - .1 INT 6.4J - Polyurethane varnish G4 premium finish.
 - .2 INT 6.4Y - Clear lacquer G4 premium grade finish.

- .9 Spray textured surfaces: ceilings:
 - .1 INT 9.1B - Latex G2 premium grade finish (over alkyd sealer).

- .10 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock type material", and textured finishes:
 - .1 INT 9.2B - High performance architectural latex G2 - all ceilings/bulkheads, G3 within suites, G4 in "public" areas, walls premium grade finish.

- .11 Canvas and cotton coverings.
 - .1 INT 10.1A - Latex G4 premium grade finish.

- .12 Bituminous coated surfaces: cast iron pipe, concrete, etc.:
 - .1 INT 10.2A - Latex G4 premium grade finish.

2.6 SOURCE QUALITY CONTROL

- .1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.
 - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

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 data sheet.

3.2 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 EXAMINATION

- .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 properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

- .3 Maximum moisture content as follows:
 - .1 Stucco, plaster and gypsum board: 12 %.
 - .2 Concrete: 12 %.
 - .3 Clay and Concrete Block/Brick: 12 %.
 - .4 Wood: 15 %.

3.4 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Consultant.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-install after painting is completed.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Consultant.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by wiping with dry, clean cloths.
 - .2 Wash surfaces with a biodegradable detergent and clean with warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .6 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.
- .7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.
- .8 Touch up of shop primers with primer as specified.
- .9 Do not apply paint until prepared surfaces have been accepted by Paint Manufacturer's Representative

3.5 APPLICATION

- .1 Method of application to be as approved by Consultant. Apply paint by brush, roller and airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work

and repaint.

- .3 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .10 Finish closets and alcoves as specified for adjoining rooms.
- .11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6
MECHANICAL/ELECTRIC
AL EQUIPMENT

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .2 Boiler room, mechanical and electrical rooms: do not paint exposed conduits, piping, hangers, ductwork and other

mechanical and electrical equipment.

- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .5 Do not paint over nameplates.
- .6 Keep sprinkler heads free of paint.
- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .8 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .9 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .10 Do not paint interior transformers and substation equipment.

3.7 SITE TOLERANCES

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.8 PAINT COLOURS

Paint Colours and Locations:

- .1 The work of this section includes painting all exposed wall and ceiling surfaces in all areas of the building unless specifically noted otherwise.
Colours: Refer to Finish Schedule Color Legend & Interiors Package

3.8 FIELD QUALITY CONTROL

- .1 Standard of Acceptance:
 - .1 Walls: no defects visible from a distance of 1000 mm at

90 degrees to surface.

.2 Ceilings: no defects visible from floor at 45 degrees 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.

.2 Advise Consultant when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Cooperate with inspection firm and provide access to areas of work.

.4 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Consultant.

3.9 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.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 The work of this Section includes the supply and installation of miscellaneous specialty items required for a complete Project.

1.2 SUBMITTALS

- .1 Samples: Submit for approval the complete range of colours, finishes and material for the various items of work specified herein. Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings: Submit shop drawings for review in accordance with Section 01 33 00 – Submittal Procedures.
- .3 Maintenance Data and Operating Instructions: Provide copies of maintenance and operating instructions in accordance with Section 01 77 00 – Closeout Submittals.

1.3 RELATED SECTIONS

- .1 Submittal Procedures Section 01 33 00

PART 2 - PRODUCTS

2.1 FIREPLACES

- .1 Napoleon Allure 60 NEFL60FH electric fireplace.
.1 5,000 BTU's, 1,500 watts.
.2 Fully recessed with front vents – refer to drawings.
.3 Complete with blower and remote control.
.4 Crystal ember bed with 3 colour flame options.
Provide remote manufacturer's millivolt thermostat. Manufacturer's standard glass front panel finished in black with custom trim surround as directed by Bassi Construction Ltd..

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 Install work securely as indicated and in accordance with shop drawings and manufacturer's instructions.

3.2 PROTECTION

- .1 Protect completed work until issuance of certificate of final completion.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENT

- .1 Division 1 applies to and governs the work of this Section.

1.2 WORK INCLUDED

- .1 Supply and install accessories as specified in this Section.

1.3 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures
- .2 Section 01 78 00 Closeout Procedures
- .3 Section 06 10 00 Plywood Blocking
- .4 Section 09 21 16 Gypsum Board Assemblies
- .5 Section 09 91 23 Interior Painting

1.4 SUBMITTALS

- .1 Submit shop drawings and catalogue cuts, for work of this Section in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop drawings or catalogue illustrations to show size and description of components, base material, surface finish inside and out, hardware and locks and installation details.

1.5 MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into Maintenance Manual specified in Section 01 78 00.
- .2 Submit three (3) copies of a list of accessories requiring supplies together with names and addresses of local distributors of the supplies.

1.6 TEMPLATES

- .1 Submit necessary templates and instructions where recesses, openings, fastenings or anchors have to be built in by other trades.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Wrap accessories to ensure protection during shipping, storage and installation.
- .2 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

- .3 Deliver products and store in location at building site where designated.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel: Commercial quality to ASTM A526, galvanized.
- .2 Stainless Steel: ASTM A167, Type 304.
- .3 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.
- .4 Supply for installation under other Sections, mounting devices and reinforcement required to be built-in for support of grab bars and imposed loads. Be responsible for giving proper notice to other Sections and supplying such reinforcement when required by other Sections for building in.
- .5 Provide client with set of special Tools / Keys

2.2 FINISHES

- .1 Chrome and Nickel Plating: ASTM B456, satin or polished finish as indicated.
- .2 Stainless Steel: #4, brushed finish.
- .3 Manufacturer's or brand names on face of units not acceptable.

2.3 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 1.6 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 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 steel anchor plates and components for installation on studding and building frames.
- .10 Tumbler locks shall be keyed alike. Provide five (5) keys.

2.4 WASHROOM ACCESSORIES (WA-00)

- .1 **WA-01** - Toilet Tissue Dispenser Double surface mounted B-4288. One at each toilet
- .2 **WA-02** - Surface Mount C Towel Dispenser Bobrick B-4262. One in washroom and one in Jan./Stor.
- .3 **WA-03** - Soap Dispensers. (surface) Bobrick B-4112. One in washroom and one in Jan./Stor.
- .4 **WA-04** - Mirrors: As per Section 08 80 50. One over each washroom sink and size as shown on drawings.
- .5 **WA-05** - Sanitary Napkin Disposal (surface): Bobrick B-254. One in each washroom
- .6 **WA-06** - Coat Hooks: Bobrick B-6827, satin finish, stainless steel. One in each washroom.
- .7 **WA-07** - Grab Bars: Stainless steel capable of resisting a minimal load of 1.3 kN vertically or horizontally, 32 mm outside diameter x 1.6 mm wall thickness, peened grip tube welded to flanges, concealed mounting with anchor devices to suit partition construction.
 - .1 Frost 1001, dimensions and locations as shown on drawings/schedule.
 - .2 Frost 1003 30"x30", one per accessible toilet location.
- .8 **WA-08** – Stainless steel shelf : Bobrick B-296, one in Acc. WC.
- .9 **WA-09** – Janitor's Shelf: Bobrick B-223 x 24 Stainless Steel Mop and Broom Holder.

3.1 INSTALLATION

- .1 Provide manufacturer's information and templates required for installation of work of this Section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this Section in order that they function as intended.
- .2 Include reinforcing, anchorage and mounting devices required for the installation of each product.
- .3 Perform drilling of steel, masonry, concrete and other materials necessary to install the Work specified in this Section.
- .4 Install work to meet manufacturer's recommended specifications, true, tightly fitting, and level or flush to adjacent surfaces, as suitable for installation. Install and secure accessories rigidly in place.
- .5 Insulate accessory surfaces to prevent electrolysis due to contact with masonry, concrete or dissimilar metal surfaces. Use bituminous paint, building paper or other approved means.
- .6 Supply for installation by other trades, mounting devices and reinforcement required to be built-in for support of grab bars and imposed loads. Be responsible for giving proper notice to other trades and supply such reinforcement when required by other trades for building in.
- .7 Installed grab bars shall be capable of supporting a downward pull of 2225 N (500 lbs.) minimum.
- .8 Stud Walls: Provide steel back-plate to stud prior to plaster or gypsum board finish. Provide plate with threaded studs or plugs.
- .9 Hollow Masonry Units or Existing Plaster or Gypsum Board: Use toggle bolts drilled into cell/wall cavity.
- .10 Solid masonry, marble, stone or Concrete: Use bolt with lead expansion sleeve set into drilled hole.
- .11 Toilet Partitions: Use male/female through bolts.
- .12 Install grab bars on built-in anchors provided by bar manufacturer.
- .13 Use tamper proof screws/bolts for fasteners.

3.2 BARRIER FREE INSTALLATION HEIGHTS

- .1 Install accessories to meet OBC Accessibility Design Guidelines,

3.3 ADJUSTMENT AND CLEANING

- .1 Upon completion of the Work or when directed, remove all protective coatings or paper.
- .2 Verify under work of this Section that installed products function properly, and adjust them accordingly to ensure satisfactory operation. Test mechanisms, hinges, locks and latches and where necessary adjust and fabricate.
- .3 Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at site only if approved.
- .4 Final cleaning as per manufacturer's recommendations.
- .5 Fill accessory units with necessary supplies and leave ready for use.

END OF SECTION

