Public Works and Government Services Canada

Requisition No. EZ899-211221

DRAWINGS & SPECIFICATIONS
for

CBSA Canopy Assessment and Repairs
Aldergrove Port of Entry, Langley, BC

Project No.: R.106402.001

APPROVED BY:

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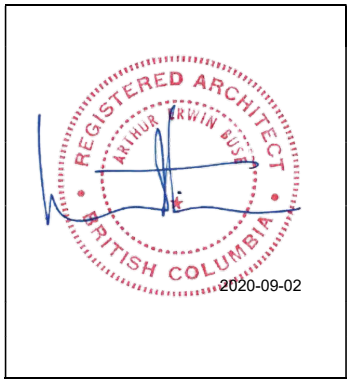
Specifications Seals Page

The following Consultants' Seal refers to specific Sections of the Specification completed by *Boldwing Continuum Architects Inc.* as noted in Section 00 01 10 – Contract Specifications - Table of Contents except Specification Sections and Appended Reports which have been prepared and / or signed and sealed by other professional engineers and consultants.

Architectural

Arthur E. Buse, Architect AIBC	1543
Name, Title	Professional Registration No.
	2020-09-02
Signature	Date



Professional Seal

The following Consultants' Seal refers to specific Sections of the Specification completed by *WSP Canada* as noted in Section 00 01 10 – Contract Specifications - Table of Contents except Specification Sections and Appended Reports which have been prepared and / or signed and sealed by other professional engineers and consultants.

Structural

Sam H.S. Chan, P.Eng., Structural Engineer	39325
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	2020-09-02
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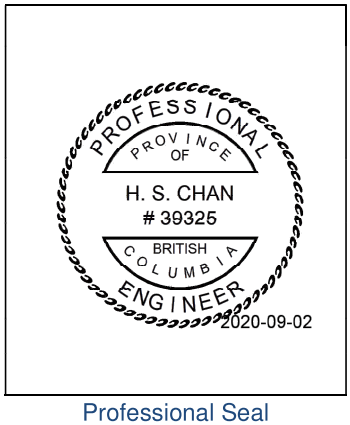

Professional Seal

END OF SECTION

END OF SECTION

1 GENERAL

1.01 WORK DESCRIBED BY CONTRACT DOCUMENTS

.1 The work of this contract comprises of the replacement of the damaged structural steel, soffit and parapet cladding and associated components of the Secondary Inspection Area (SIA) Canopy at the Aldergrove Port of Entry, located at 10 - Highway 13, Langley, British Columbia.

.2 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents.

.1 Temporary removal and reinstallation of components as indicated and as required to complete work. Refer to Section 01 14 00 – Work Restrictions.

.2 Protection of existing adjacent finishes and materials.

.3 SIA Canopy:

.1 Structural steel column replacement and tightening of adjacent steel connections.

.1 Removal of existing temporary steel posts and bracing.

.2 Replacement of crimped steel roof decking.

.3 Removal and replacement of roofing as required to area affected by crimped steel roof decking.

.4 Replacement of damaged soffits and infill of soffit already removed, with soffit material to match existing.

.5 Installation of new parapet panels and cap flashing to replace those removed or damaged, with material to match existing.

.6 Repairs to curb and sidewalk at base of steel column as required.

.4 Miscellaneous site works items:

.1 Replacement of signage at northwest corner entrance/exit of the site.

.2 Replacement of the damaged concrete sidewalk and curbs at this same location.

.3 Repairs to the damaged strip of pavement west of the Secondary canopy.

.3 Canada Border Services Agency (CBSA) will occupy premises for normal operations during entire period. Cooperate with Departmental Representative in scheduling operations to minimize conflict and to facilitate usage.

1.02 TIME OF COMPLETION

.1 Commence work upon notification of acceptance and complete work of the SIA canopies in eighteen weeks.

1.03 MINIMUM STANDARDS

.1 Work to conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2015 (NBC) and applicable Provincial and Municipal codes. In the case of conflict or discrepancy, the most stringent requirement applies.

.2 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

1.04 CONTRACT DOCUMENTS

.1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.

.2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work. **Drawings have been prepared in colour for clarity purposes and are intended to be printed in colour.** Contractor is responsible for any misinterpretations caused as a result of printing in black and white.

1.05 DIVISION OF SPECIFICATIONS

.1 The specifications are subdivided in accordance with the 6-digit National Master Specifications System.

.2 A division may consist of the work of more than one subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.

.3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

1.06 TAXES

.1 Pay all taxes properly levied by law (including Federal, Provincial, and Municipal).

1.07 REGULATORY REQUIREMENTS

.1 Obtain and pay for Building Permit, Certificates, Licenses, and other permits required by regulatory municipal, provincial or federal authorities to complete the work.

.2 Provide inspection authorities with plans and information required for issue of acceptance certificates.

.3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

1.08 PROJECT MEETINGS

.1 In accordance with Section 01 31 19 – Project Meetings, Departmental Representative will schedule a project start-up meeting following notice of acceptance.

.2 Agenda to include lines of communication, contact information, scheduling, and coordination.

.3 Subsequent meetings will be called as required. Contractor should allow for project meeting every 2 weeks.

1.09 CONTRACTOR'S USE OF SITE

.1 Use of site:

.1 The Aldergrove Port of Entry will remain operational. Canada Border Services Agency (CBSA) has control over the entire site. All border activities and security controls must remain operational at all times unless otherwise indicated. Coordinate with the Departmental Representative for all activities that impact on-going operations.

.2 Work restrictions and security provisions will be enforced.

.3 The Contractor assumes responsibility for assigned premises for laydown and storage areas and for performance of this work.

.4 The Contractor will be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.

.2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.

.3 Do not unreasonably encumber site with material or equipment.

.4 Maintain scaffolding and hoarding throughout duration of work. Do not exceed areas indicated unless written approval by Departmental Representative is provided.

.5 Execute work with least possible interference or disturbance to normal use. Make arrangements with Departmental Representative to facilitate work as stated.

.6 Maintain existing services and provide for personnel, visitor, and vehicle access.

.7 Where security is reduced by work, provide temporary means to maintain security. Review measures with Departmental Representative before proceeding.

1.10 HOURS OF WORK

.1 In accordance with Section 01 14 00 – Work Restrictions, the Aldergrove Port of Entry is operational 16 hours per day, 7 days a week.

.2 Carry out noise generating Work during low volume hours.

.1 Monday to Friday 08:00 to 14:00 and 18:00 to 07:00.

.2 Refer to Section 01 56 00 – Temporary Barriers & Enclosures for allowable decibel levels and noise mitigation requirements.

.3 Notify Departmental Representative of all after hours work, including weekends and holidays. Work may not be permitted during holidays and weekends due to heavier border traffic and must be approved by Departmental Representative.

1.11 NON-SMOKING ENVIRONMENT

.1 Smoking is not permitted on site.

1.12 WORK SCHEDULE

.1 Provide detailed project schedule (Gantt Chart) within 5 working days of Award of Contract date showing phasing activity sequencing, interdependencies, inspections, and duration estimates. Include listed activities as follows:

.1 Shop drawings.

.2 Samples.

.3 Approvals.

.4 Procurement.

.5 Construction (Phased).

.6 Surface preparation.

.7 Application.

.8 Inspections.

.9 Turnover and Acceptance.

.2 Do not change approved schedule without notifying Departmental Representative.

.3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

.4 Schedule Work in consultation with Departmental Representative to minimize impact on public use of facility during operating hours.

1.13 SUBMITTALS

.1 In accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data: Manufacturers catalogue sheets, brochures, literature, performance charts and diagrams.

.1 Submit electronic copies of documentation.

.2 Delete information not applicable to project.

.3 Cross-reference product data information to applicable portion of Contract Documents.

.3 Samples: examples of materials, equipment, quality, finishes and workmanship.

.1 Provide two samples of each cladding as indicated in technical sections.

.2 Where colour, pattern or texture is criterion, submit full range of physical samples.

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

.4 Shop Drawings:

.1 Submit electronic copies of all shop drawings to include:

.1 Date.

.2 Project Title and number.

.3 Name and address of Subcontractor, Supplier and Manufacturer.

.4 Fabrication.

.5 Key plan and layout, showing dimensions, including identified field dimensions and clearances.

.6 Setting or erection details.

.7 Relationship to adjacent work.

.8 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.9 Revised shop drawing submissions to be clearly bubbled where revised.

.2 Submit drawings stamped and signed by professional engineer registered and licensed in the Province of British Columbia as indicated required in Technical Sections.

1.14 COST BREAKDOWN

.1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating Contract price.

1.15 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.

.2 Contract Specifications.

.3 Addenda to Contract Documents.

.4 Copy of approved work schedule.

.5 Reviewed and approved Shop Drawings and Submittals.

.6 List of Outstanding Shop Drawings.

.7 Change Orders.

.8 Other Modifications to Contract.

.9 Field Reports.

.10 Reviewed and approved samples.

.11 National Building Code, 2015.

.12 Health and Safety Plan and Other Safety Related Documents.

.13 Other documents as specified.

1.16 HEALTH, SAFETY AND HAZARDOUS MATERIALS

.1 In accordance with Section 01 35 33 – Health and Safety Requirements, comply with Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and the provision of Safety Data Sheets (SDS).

.3 Comply with British Columbia Workers Compensation Act.

.4 Perform duties in accordance with the British Columbia Occupational Health and Safety Regulation.

.5 Submit copies of WCB Clearance Letter and WCB Contractor Rating. Submit copy of Final WCB Clearance Letter at completion of project.

.6 Submit letter stating that Contractor assumes the role of Prime Contractor for the purposes of site safety responsibility and the Workers Compensation Act.

.7 Submit 2 copies of the Contractor's generic Health and Safety Plan and 2 copies of the site-specific Health and Safety Plan within 5 days after date of Notice to Proceed and prior to commencement of Work. Site-specific Plan must include the results of the site specific safety hazard assessment, and the results of the safety, health and hazard analysis for the site tasks as described in the Work plan, and proposed mitigations for the identified hazards.

.8 Submit copies of work site health and safety meeting minutes, inspection reports, reports or directions issued by Federal, Provincial or Municipal health and safety inspectors, incident and accident reports, and follow-up reports.

.9 Be responsible for the health and safety of persons on site, safety or property on site and the environment to extend that they may be affected by conduct of Work.

1.17 EXAMINATION

.1 Examine site and be familiar and conversant with existing conditions likely to affect work.

.2 Prior to beginning work, provide a photographic report of surrounding areas, including existing conditions of items included within scope of work and items to be protected (which may be liable to damage or be the subject of subsequent claims). Digital documentation to include (indicate on plan where image taken):

.1 SIA, in area affected by the Work:

.1 Steel: column, related beams, purlins and other support members.

.2 Underside of roof decking.

.3 Soffit and parapet support members and cladding.

.4 Rainwater leader.

.5 Concrete sidewalks and asphalt lanes.

.2 Site works:

.1 Parking area west of the canopy.

.2 Landscape planter, concrete sidewalk and curbs

.3 Landscape planter, concrete sidewalk and curbs at the northwest corner entry/exit of the site.

.3 Photographs not to include uniformed staff on duty, vehicles or the public.

1.18 SETTING OUT OF WORK

.1 Review existing conditions with contract documents and identify in writing to Departmental Representative of any discrepancies.

1.19 ACCEPTANCE OF SUBSTRATES

.1 Each trade shall examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Contractor. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

1.20 QUALITY OF WORK

.1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman, with required years of experience as indicated within Technical Sections.

.2 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code Construction Standards.

.3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

1.21 WORKS COORDINATION

.1 Coordinate work of subtrades:

.1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.

.2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.

.1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.

.2 Coordinate work illustrating potential interference between work of various trades and distribute to affected parties.

.3 Facilitate meetings and review coordination drawings. Ensure subcontractors agree and sign off on drawings.

.4 Prepare and publish minutes of each meeting.

.5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.

.3 Submit shop drawings only after coordination meeting for such items has taken place.

.4 Work cooperation:

.1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of interference.

.2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, patching and removal or replacement of completed work.

.3 Ensure disputes between subcontractors are resolved.

.5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.

.6 Maintain efficient and continuous supervision. Full-time site superintendent required throughout project.

1.22 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

.1 In accordance with Section 01 33 00 – Submittal Procedures, submit the requested shop drawings, product data, SDS sheets and samples indicated in each of the technical Sections.

.2 Allow sufficient time for the following:

.1 Review of product data.

.2 Approval of shop drawings.

.3 Review of re-submission.

.4 Ordering of approved material and/or products - refer to technical sections.

1.23 TESTING AND INSPECTIONS

.1 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:

.1 Testing for structural materials as required by the Contract documents.

.2 Inspection and testing required by laws, ordinances, rules, regulations, or orders of public authorities.

.3 Inspection and testing performed exclusively for Contractor's convenience.

.4 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require verifying acceptability of corrected work.

.2 Contractor shall furnish labour and facilities to:

.1 Notify Departmental Representative in advance of planned testing.

.3 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

.4 The Departmental Representative may require, and pay for, additional inspection and testing services not included in above.

.5 Provide Departmental Representative with copies of inspection and test reports as soon as available.

1.24 AS-BUILT DOCUMENTS

.1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, for "as-built" purposes.

.2 As work progresses, maintain accurate records to show all deviations from the Contract documents including where remediation work could not be performed. Note on as-built specifications, drawings and shop drawings as changes occur.

.3 Submit for review copies of red-marked as-built drawings completed to date with each progress claim submission.

1.25 CLEANING

.1 In accordance with Section 01 74 11 – Cleaning, conduct daily cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.

.2 Ensure cleanup of the work areas each day after completion of work.

.3 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

1.26 ACCESS

.1 In preparation for inspections and reviews:

.1 Have man lift with qualified operator available for Departmental Representative use during field reviews and inspections.

1.27 CONTROL

.1 In accordance with 01 56 00 – Temporary Barriers and Enclosures, design, erect and maintain hoarding to support all loads (including wind loads) and provide protection, complete with signage and electrical lighting as required by authority having jurisdiction and Departmental Representative.

.2 Maintain and relocate protection until work is complete.

1.28 ENVIRONMENTAL PROTECTION

.1 In accordance with Section 01 35 43 – Environmental Procedures, prevent extraneous materials from contaminating air beyond construction area, by providing temporary enclosures during work.

.2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.

.3 Ensure proper disposal procedures in accordance with all applicable federal, provincial and municipal regulations.

1.29 ADDITIONAL DRAWINGS

.1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.

.2 Electronic copies of the drawings will be available for Contractor use and printing.

1.30 SYSTEM OF MEASUREMENT

.1 The metric system of measurement (SI) will be employed on this Contract.

1.31 FAMILIARITY WITH SITE

.1 Before submitting tender, visit site as indicated in tender documents and become familiar with all conditions likely to affect the cost of the work.

1.32 SUBMISSION OF TENDER

.1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has examined the Contract documents, inspected the site, and is fully conversant with all conditions.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 ACCESS AND EGRESS

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

.2 Coordinate construction, staff and delivery vehicles accessing contractor's lay-down area with CBSA Facility Personnel to minimize disturbance to ongoing CBSA operations.

.3 All deliveries and construction vehicle access which require escort services against SIA traffic will require a minimum of 24 hours notice to Departmental Representative so that an escort may be arranged. Deliveries are to be between 07:00 and 08:00 whenever possible.

1.02 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security as approved by Departmental Representative.

.4 Refer to Section 01 52 00 – Construction Facilities for sanitary facility requirements. Construction staff will not be allowed to use restrooms in the buildings.

.5 Protection: protect work temporarily until re-coating work is completed.

1.03 HOURS OF WORK

.1 The Port of Entry is operational 16 hours per day, 7 days a week. Contractor to submit proposed hours-of-work to Departmental Representative for review and approval.

.2 Disruptive construction noise and operations may require work to be executed during low Port of Entry volume periods. Low volume hours are typically Sundays to Fridays between 08:00 - 14:00 and 18:00 to 24:00.

.3 Contractor shall give 72 hours notice to Departmental Representative for request of work to be completed outside of normal working hours (subject to CBSA approval).

1.04 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises.

.2 Protect existing finishes as follows:

.1 Secondary Canopy: all adjacent soffit and fascia surfaces during removal of panels and replacement as required. Repair or make good to better condition any damage to existing finishes.

.3 Any work which impacts the operations onsite (traffic, commercial, support staff, etc.) must have one (1) week notice and must be approved by CBSA. CBSA maintains the right to have work completed after hours (20:00 – 08:00 on weekdays).

1.05 NOISE GENERATION

.1 Construction noise levels which disrupt the processing of travelers shall be conducted during the low volume hours as determined by CBSA.

.2 Means and procedures of controlling and isolating other excessive or disturbing noise and vibration affecting occupied areas shall be the responsibility of the Contractor and approved by the Departmental Representative and CBSA.

1.06 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission. Provide one (1) week's notice to Departmental Representative and CBSA for permission. All shut downs shall occur during low border volume periods, as determined by CBSA.

.2 Contractor will be responsible for damages to facility equipment as a result of service shut downs.

.3 Provide for personnel, pedestrian and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.5 Contractor will not be allowed to connect to existing data and communication services for his own use.

1.07 SPECIAL REQUIREMENTS

.1 Traffic lane closures:

.1 Secondary lanes S2, S3, S4 and S5 must remain operational daily from 08:00 to 24:00 hours. South secondary lanes up to and including part of S2 are existing lanes that will be closed for the duration of the project, and may be utilized for the work.

.2 Inbound Parking and associated sidewalks:

.1 Inbound parking stalls will be for Contractor use for the duration of the Work.

.2 Pedestrian access to the Front Entry must be maintained from the Inbound parking stalls, including for those with disabilities.

.3 Pedestrian and Bicycle Walkways:

.1 Pedestrian and Bicycle Walkways must remain operational. Provide protection and lighting as required in accordance with Section 01 56 00 – Temporary Barriers & Enclosures.

.4 Security Cameras:

.1 Security cameras are to remain operational. Cameras requiring temporary relocation are the responsibility of CBSA. Contractor to provide one (1) week notice to Departmental Representative for cameras requiring relocation.

.5 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.6 Keep within limits of work and avenues of ingress and egress.

.7 Deliver materials outside of peak traffic hours, typically 18:00 to 07:00 and 08:00 to 14:00 and to be confirmed by Departmental Representative.

1.08 SECURITY

.1 Obey the following CBSA Security Directives:

.1 Contractor’s Site Superintendent is responsible to sign in and out all crew members at the beginning and end of each shift.

.2 Contractor’s personnel shall be in possession of Government issued picture identification at all times while on CBSA property.

.3 Remain within the designated work areas. Movement within CBSA restricted areas must be approved and require CBSA escort.

.4 Do not interfere with Port of Entry inspection processes. Move away from CBSA officials interacting with the travelling public to avoid overhearing potentially sensitive and personal conversations.

.5 Construction personnel shall not have any interaction with the travelling public.

.6 Be accountable for tools/equipment at all times. Do not leave tools unattended.

.7 Act professionally at all times. No foul language or rude behavior will be tolerated.

.8 Do not interact with the travelling public.

.9 Obey uniformed CBSA officers when given operational directives (these may include being instructed to move off site during a dangerous situation or to stop work because of operational requirements. Report to the Departmental Representative when such instructions have been given (as early as is convenient).

.1 Do not take directions from uniformed officers or PWGSC building maintenance regarding remediation work.

.10 No music permitted.

1.09 BUILDING SMOKING ENVIRONMENT

.1 Smoking is not permitted.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Particular requirements for independent inspection and testing to be carried out by third party inspectors and testing retained by Departmental Representative are specified under sections as follows:

.1 Section 01 45 00 – Quality Control.

.2 Section 03 30 00 – Cast-in-Place Concrete (Non-Structural).

.3 Section 09 96 00 – High-Performance Coatings.

.4 Section 32 12 16 – Asphalt Paving.

.5 Structural Specifications – Concrete testing, mill steel testing.

1.02 APPOINTMENT AND PAYMENT

.1 Departmental Representative will appoint and pay for services of third party inspection and testing laboratory except follows:

.1 Testing for structural materials as required by the Contract documents.

.2 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.3 Inspection and testing performed exclusively for Contractor's convenience.

.4 Testing and adjustment of electrical equipment and systems.

.5 Tests specified to be carried out by Contractor under supervision of Departmental Representative.

.2 Where inspections or tests reveal Work not in accordance with contract requirements, pay costs for additional inspections and tests as required by Departmental Representative to verify acceptability of corrected work.

1.03 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 Departmental Representative 72 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 Departmental Representative.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE

.1 Departmental Representative will arrange pre-construction project meeting.

.2 Contractor to assume responsibility for setting meeting times and recording and distributing meeting minutes.

.1 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to Departmental Representative, meeting participants and affected parties not in attendance.

.2 Include significant proceedings and decisions. Identify actions by parties.

.3 Contractor to provide physical space and make arrangements for progress meetings.

.4 Contractor to attend project meetings throughout the progress of the work and at the call of Departmental Representative.

1.02 PRECONSTRUCTION MEETING

.1 Departmental Representative will:

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

.2 Departmental Representative, Contractor, major Subcontractors, field reviewers and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.

.4 Provide Agenda. Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 11 55 – General Instructions and Bar (Gantt) Chart.

.3 Schedule of shop drawings submissions and samples. 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 and hoarding and scaffolding in accordance with Section 01 56 00 – Temporary Barriers & Enclosures.

.5 Delivery schedule of specified equipment.

.6 Site security in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.8 Record drawings in accordance with Section 01 78 00 – Closeout Submittals.

.9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 – Closeout Submittals.

.10 Monthly progress claims, administrative procedures, photographs, hold backs.

.11 Appointment of inspection firms.

.12 Insurances, transcript of policies.

1.03 PROGRESS MEETINGS

.1 Contractor will:

.2 During course of Work and up to project completion, schedule progress meetings every two weeks. Additional meetings will be scheduled to resolve extraordinary issues as required.

.3 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.4 Notify parties minimum one week (7 days) prior to meetings.

.5 Contractor will record minutes of progress meetings and circulate to attending parties and affected parties not in attendance.

.6 Provide Agenda. 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 effect on construction schedule and on completion date.

.12 Other business.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

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1 GENERAL

1.01 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, expected cost, and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide a five-day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Milestone: significant event in project, usually completion of major deliverable.

.7 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.8 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.02 REQUIREMENTS

.1 Ensure Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress and Final Certificate as defined times of completion are of essence of this contract.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit Project Schedule to Departmental Representative within five (5) working days of receipt of Contract Award.

1.04 PROJECT SCHEDULE

.1 Ensure detailed Project Schedule is prepared and printed in colour and includes as minimum milestone and activity types as follows:

.1 Award.

.2 Blackout Period.

.3 Hoarding/Scaffolding.

.4 Shop Drawings, Samples.

.5 Permits.

.6 Mobilization.

.7 Preparation.

.8 Phased Remediation.

.9 Substantial Completion.

.10 Total Completion.

1.05 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule monthly with progress claim submission reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current two week forecast, defining problem areas, anticipated delays and impact with possible mitigation.

1.06 PROJECT MEETINGS

.1 Discuss Project Schedule at site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 07 92 00 – Joint Sealants.

.3 Section 07 42 43 – Composite Wall Panel System.

.4 Section 07 42 93 – Soffit Panel System.

.5 Section 07 62 00 – Sheet Metal Flashings.

.6 Section 09 91 13 – Exterior Painting.

.7 Section 09 96 00 – High-Performance Coatings.

.8 Section 10 14 00 – Signage.

.9 Section 32 12 16 – Asphalt Paving.

1.02 ADMINISTRATIVE

.1 Submit to Departmental Representative 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 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.3 Where items or information is not produced in SI Metric units converted values are acceptable.

.4 Review submittals prior to submission to Departmental Representative verifying field measurements and compliance with contract documents. 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 reviewed by the Contractor, marked up for on-site coordination, stamped and signed by the same, dated and identified as to specific project will be returned without being examined and considered rejected***.

.1 Verify field measurements and affected adjacent Work are coordinated.

.2 Project schedule will not be extended due to Departmental Representative re-review of resubmitted shop drawing submittals.

.3 Keep one reviewed copy of each reviewed submittal on site.

.5 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Do not proceed with work or order construction materials or products until relevant submissions are reviewed and approved by the Departmental Representative.

1.03 SUBMISSION REQUIREMENTS

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

.2 Accompany submissions with transmittal letter, in duplicate, containing:

.1 Date.

.2 Project title and number.

.3 Contractor’s name and address.

.4 Identification and quantity of each shop drawing, product data and sample.

.5 Other pertinent data.

.3 Submissions shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor’s stamp, signed by Contractor's authorized representative, certifying approval of submissions, verification of field measurements and compliance with Contract documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.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 Relationship to adjacent work.

.4 After Departmental Representative's review, distribute copies. Keep one reviewed copy of each submission on site.

1.04 SHOP DRAWINGS

.1 Shop drawings: original drawings or modified standard drawings, diagrams, illustrations, schedules, performance charts, brochures or other data provided by Contractor to illustrate details of portions of work which are specific to project requirements.

.1 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. Provide cross references to drawings and specifications.

.2 Submit electronic drawings for each requirement requested in technical specification sections and as requested by Departmental Representative. Where indicated, provide stamped and signed shop drawings by professional engineer registered or licensed in the Province of British Columbia.

.3 Cross- reference shop drawing information to applicable portions of the Contract documents.

.4 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.5 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.6 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.7 Delete information not applicable to project.

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

1.05 SHOP DRAWING REVIEW

.1 Review of shop drawings by the Departmental Representative is for the sole purpose of ascertaining conformance with the general concept.

.1 Allow five (5) business days for Departmental Representative's review of each submission.

.2 This review shall not mean that the Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.

.3 This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and Contract documents.

.4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with ordering materials or Work.

.5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested. All revisions to be clearly clouded.

.6 Without restricting the generality of the foregoing, the Contractor is responsible for:

.1 Dimensions to be confirmed and correlated at the job site.

.2 Information that pertains solely to fabrication processes or to techniques of construction and installation.

.3 Coordination of the work and all sub-trades.

.7 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, electronic copy will be returned and ordering, 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.

.8 Shop drawings to incorporate applicable key plan, plan, elevations and details for all work submitted. No materials to be ordered and no work to be fabricated shall be undertaken until shop drawings and other related submittals are reviewed.

1.06 PRODUCT DATA

.1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products or any other specified information.

.1 Submit electronic copies of product data.

.2 Delete information not applicable to project.

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

.2 Cross-reference product data information to applicable portions of Contract documents.

1.07 SAMPLES

.1 Submit for review samples in duplicate as requested in individual technical specification sections. Label samples with origin and intended use. One sample will be returned with Shop Drawing Review.

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

.3 Where colour, pattern or texture is criterion, submit full range of physical samples.

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

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

1.08 MOCK-UPS

.1 Erect mock-ups where directed by Departmental Representative and in accordance with Section 01 45 00 – Quality Control.

1.09 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copies of colour digital photography in jpg standard resolution, monthly with progress statement and as directed by Owner's Representative.

.1 Project identification: name and number of project and date of exposure indicated.

.2 Number of viewpoints and their location as determined by Owner's Representative.

.3 Frequency of photographic documentation: as directed by Owner's Representative.

.1 Upon completion of: excavation, foundation, framing and services before concealment of Work, and as directed by Owner's Representative.

.4 Submit photos of each condition at end of project and include updated consolidated report in Operating and Maintenance Manual in accordance with Section 01 78 00 – Closeout Submittals.

.2 Consultant Progress Observation Reports and Field Reviews: Contractor is responsible for providing photographs in jpg format to demonstrate how deficient items identified within the reports have been corrected.

1.10 PROGRESS SCHEDULE

.1 Submit work schedule and cost breakdown in accordance with Section 01 11 55 – General Instructions and Section 01 32 16.07 – Construction Progress Schedule – Gantt Bar Chart.

1.11 INSPECTION REPORTS

.1 Submit electronic test results and inspection reports as received and where indicated.

1.12 CERTIFICATES AND TRANSCRIPTS

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

.2 Submit transcription of insurance immediately after award of Contract.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

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1 GENERAL

1.01 REFERENCES

.1 Manual of Uniform Traffic Control Devices for Streets and Highways (UTCD), 2002.

1.02 PROTECTION OF TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:

.1 Place equipment in position to minimize interference and hazard to travelling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.

.3 Do not leave equipment on travelled way overnight.

.3 Secondary lanes S3 – S6 must remain operational daily from 08:00 to 24:00 hours. Refer to 01 14 00 – Work Restrictions.

1.03 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.1 As directed by CBSA Facility Personnel and Departmental Representative, provide lane detours to facilitate passage of traffic around restricted construction area.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices of UTCD manual.

.3 Place signs and other devices in locations recommended in UTCD Manual.

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

.5 Continually maintain traffic control devices in use:

.1 Check daily for legibility, damage, suitability, and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Remove devices which do not apply to conditions existing from day to day.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

PWGSC Update on Asbestos Use

Effective April 1, 2016, all Public Works and Government Services of Canada (PWGSC) contracts for new construction and major rehabilitation will prohibit use of asbestos-containing materials.

COVID 19

All contractors shall follow Canadian Construction Association COVID-19 - Standardized Protocols for All Canadian Construction Sites.

1.01 REFERENCES

.1 Government of Canada.

.1 Canada Labour Code - Part II (as amended)

.2 Canada Occupational Health and Safety Regulations (as amended).

.2 National Building Code of Canada (NBC): (as amended)

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 The Canadian Electric Code (as amended)

.4 Canadian Standards Association (CSA) as amended:

.1 CSA Z797-2018 Code of Practice for Access Scaffold.

.2 CSA S269.1-2016 Falsework for Construction Purposes.

.3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.

.4 CSA Z1006-10 Management of Work in Confined Spaces.

.5 CSA Z462-18 Workplace Electrical Safety Standard.

.5 National Fire Code of Canada 2015 (as amended)

.1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.

.6 American National Standards Institute (ANSI): (as amended)

.1 ANSI/ASSP A10.3-2013, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.7 Province of British Columbia:

.1 Workers Compensation Act Part 3-Occupational Health and Safety. (as amended)

.2 Occupational Health and Safety Regulations. (as amended)

1.02 RELATED SECTIONS

.1 Refer to the following current NMS sections as required:

.1 General Instructions – Section 01 11 55

.2 Submittal procedures – Section 01 33 00

.3 Temporary utilities – Section 01 51 00

.4 Temporary barriers and enclosures – Section 01 56 00

1.03 WORKERS' COMPENSATION BOARD COVERAGE

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.04 COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent, and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.05 SUBMITTALS

.1 Submit to Departmental Representative submittals listed for review in accordance with Section 01 11 55 and Section 01 33 00.

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

.3 Submit the following:

.1 Organizations Health and Safety Plan.

.2 Site Specific Health and Safety Plan (SSSP or HASP).

.3 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.4 Copies of incident and accident reports.

.5 Complete set of current Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.6 Emergency Procedures.

.4 The Departmental Representative will review the Contractor's Site Specific Safety Plan or Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 Submission of the Site Specific Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.06 RESPONSIBILITY

.1 Assume responsibility as the Prime Contractor for work under this contract.

.2 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.

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with Site Specific Health and Safety Plan.

1.07 HEALTH AND SAFETY COORDINATOR

.1 Assign a competent and qualified Health and Safety Coordinator who shall:

.1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, revising, daily enforcing, and monitoring the Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP).

.3 Be on site during execution of work.

.4 Have minimum two (2) years' site-related working experience.

.5 Have working knowledge of the applicable occupational safety and health regulations.

1.08 GENERAL CONDITIONS

.1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.2 Secure site at nighttime or provide security guard as deemed necessary to protect site against entry.

1.09 PROJECT / SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Multi-employer work site.

.2 Federal employees and general public.

.3 Energized electrical services.

.4 Working from heights.

1.10 UTILITY CLEARANCES

.1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work.

.2 The Contractor will not rely solely upon the Reference Drawings or other information provided for utility locations.

1.11 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirements, the Departmental Representative will advise on the course of action to be followed.

1.12 WORK PERMITS

.1 Obtain specialty permit(s) related to project before start of work.

1.13 FILING OF NOTICE

.1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities prior to commencement of work. (All construction projects require a Notice of Work.)

.2 Provide copies of all notices to the Departmental Representative.

1.14 SITE SPECIFIC HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with the Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP) based on the required hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

.1 Contractor's safety policy.

.2 Identification of applicable compliance obligations.

.3 Definition of responsibilities for project safety/organization chart for project.

.4 General safety rules for project.

.5 Job-specific safe work procedures.

.6 Inspection policy and procedures.

.7 Incident reporting and investigation policy and procedures.

.8 Occupational Health and Safety Committee/Representative procedures.

.9 Occupational Health and Safety meetings.

.10 Occupational Health and Safety communications and record keeping procedures.

.11 COVID-19 Protocols and Procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work. SDS required for all products.

.4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Site Specific Safety Plan (SSSP) and/or Health and Safety Plan (HASP) as required, and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Site Specific Safety Plan and/or Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Safety Plan and/or Health and Safety Plan of responsibility for meeting all requirements of construction and Contract documents and legislated requirements.

1.15 EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.5 A route map with written directions to the nearest hospital or medical clinic.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work at high angles.

.2 Work in confined spaces or where there is a risk of entrapment.

.3 Work with hazardous substances.

.4 Underground work.

.5 Work on, over, under and adjacent to water.

.6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 Revise and update emergency procedures as required and re-submit to the Departmental Representative.

.6 Contractors must not rely solely upon 911 for emergency rescue in a confined space, working at heights, etc.

1.16 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable SDS and WHMIS 2015 documents as per Section 01 11 55 and Section 01 33 00.

.2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.

.3 Provide adequate means of ventilation in accordance with Section 01 51 00.

.4 The contractor shall ensure that the product is applied as per manufacturers recommendations.

.5 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

1.17 ASBESTOS HAZARD

.1 Carry out any activities involving asbestos in accordance with applicable Federal and Provincial Regulations.

.2 Removal and handling of asbestos will be in accordance with applicable Provincial / Federal Regulations.

1.18 SILICA

.1 Carry out work in accordance with WorkSafe BC regulations.

1.19 PCB REMOVALS

.1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.

.2 Remove, handle, transport and dispose of as indicated in Division 2 specifications.

1.20 REMOVAL OF LEAD-CONTAINING PAINT

.1 All paint containing TCLP lead concentrations above 5 ppm are classified as hazardous.

.2 Carry out demolition and/or remediation activities involving lead-containing paints in accordance with current applicable Provincial / Territorial Regulations.

.3 Work with lead-containing paint shall be completed as per Provincial and Federal regulations.

.4 Dry Scraping/Sanding of any materials containing lead is strictly prohibited.

.5 The use of Methylene Chloride based paint removal products is strictly prohibited.

1.21 ELECTRICAL SAFETY REQUIREMENTS
(Reference: WorkSafe BC OHS Regulation Part 19 – Electrical Safety)

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate arc flash protection, required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.22 ELECTRICAL LOCKOUT

.1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a logbook for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.23 OVERLOADING

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.24 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003) (as amended).

1.25 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2018 (as amended) and B.C. Occupational Health and Safety Regulations (as amended).

1.26 CONFINED SPACE

.1 Carry out work in compliance with current Provincial / Territorial regulations.

1.27 POWER-ACTUATED DEVICES

.1 Use powder-actuated devices in accordance with ANSI A10.3 (as amended) only after receipt of written permission from the Departmental Representative.

1.28 FIRE SAFETY AND HOT WORK

.1 Obtain in Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

.3 Hot Work permits are a mandatory requirement for any hot work activities.

1.29 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (as amended).

.3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the Departmental Representative is required prior to any gas or diesel tank being brought onto the work site.

1.30 FIRE PROTECTION AND ALARM SYSTEM

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

1.31 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

1.32 POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:

.1 Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP).

.2 Sequence of work.

.3 Emergency procedures.

.4 Site drawing showing project layout, locations of the first-aid station, marshalling station, and the emergency transportation provisions.

.5 Notice of Project.

.6 Floor plan or site plans. Must be posted in a non-inmate access area and locked up when not being used.

.7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.

.8 Workplace Hazardous Materials Information System (WHMIS 2015) documents.

.9 Safety Data Sheets (SDS).

.10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.11 All Hazardous Material and Substance Reports including Lab Analysis.

.2 Post all Safety Data Sheets (SDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

.3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.33 MEETINGS

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.34 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a “stop work order”.

2 PRODUCTS

.1 Not used.

3 EXECUTION

.1 Not used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Definitions:

.1 Environmental Pollution and Damage: presence of chemical, Physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.02 FIRES

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

1.03 DRAINAGE

.1 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

.3 Contractor to provide temporary re-routing of rain water leaders to surface drainage systems during remediation work in accordance with Section 01 51 00 – Temporary Utilities.

1.04 POLLUTION CONTROL

.1 Control emissions from equipment to local authorities' emission requirements.

.2 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

.1 Provide temporary enclosures where indicated and as directed by Departmental Representative.

1.05 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.1 Do not take action until after receipt of written approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for recycling and disposal in accordance with Section 01 74 19 - Waste Management and Disposal.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 07 27 13 – Self Adhesive Membrane.

.3 Section 07 42 43 – Composite Wall Panel System.

.4 Section 07 42 93 – Soffit Panel System.

.5 Section 07 52 00 – Modified Bitumen Roofing.

.6 Section 07 62 00 – Sheet Metal Flashings.

.7 Section 07 90 00 – Sealants.

.8 Section 09 91 13 – Exterior Painting.

.9 Section 09 96 00 – High Performance Coatings.

.10 Structural Specifications.

1.02 RECORD OF EXISTING CONDITIONS

.1 Before project start, photograph project site and existing conditions in accordance with Section 01 11 55 – General Instructions and Section 01 33 00 – Submittal Procedures.

1.03 RECORD OF CONDITIONS DURING CONSTRUCTION

.1 Before start of work each day, record environmental conditions including temperature, humidity, precipitation, and wind.

.1 Where environmental conditions outside of acceptable conditions, Contractor to condition area to allow for continuation of work.

.2 Contractor to submit weekly reports of conditions and remediation measures to Departmental Representative.

1.04 INSPECTION

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

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

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

1.05 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by the Contractor for purpose of inspecting portions of Work. Cost of such services will be borne by Contractor. Said inspections, testing and quality assurance shall include, but not be limited to the following:

.1 Asphalt paving and inspecting.

.2 Concrete mix design and testing.

.3 Mill tests for steel.

.4 Painting and Coating inspection.

.5 Inspection and testing of all materials, components as called for specifically in each specification Section and as required.

.2 Submit for approval by Departmental Representative names of proposed Independent Inspection/Testing Agencies.

.3 Allow inspection/testing agencies access to Work. Cooperate to provide reasonable facilities including man lifts for such access.

.4 Provide equipment (including man lift with qualified operator) as required for executing inspection and testing by appointed agencies.

.5 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.6 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 Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.06 PROCEDURES

.1 Notify appropriate agency and Departmental Representative 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.

1.07 REJECTED WORK

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

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

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

1.08 REPORTS

.1 Submit electronic copies of inspection and test reports to Departmental Representative.

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

1.09 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

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

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

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1 GENERAL

1.01 REFERENCES

.1 Canadian Standards Association (CSA) as amended:

.1 CAN/CSA Z321-96(R2006), Signs and Symbols for the Occupational Environment.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

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

1.03 STORAGE FACILITIES

.1 Contractor to provide storage space, located where directed by Departmental Representative. Refer to Section 01 52 00 – Construction Facilities.

1.04 WATER SUPPLY

.1 Water supply is available at existing building and may be used for construction purposes at no cost.

.1 Hose bib locations to be confirmed by Departmental Representative.

1.05 TEMPORARY DRAINAGE

.1 Contractor to provide temporary re-routing of existing rainwater leaders to surface drainage systems which will be temporarily removed during remediation work.

1.06 POWER AND LIGHT

.1 Departmental Representative will pay for power during construction for temporary lighting and operating of power tools. Contractor is to provide for connection to existing power to serve requirements. Do not overload existing power supply.

.2 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

.3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

1.07 TEMPORARY COMMUNICATION FACILITIES

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

1.08 SANITARY FACILITIES

.1 Refer to Section 01 52 00 – Construction Facilities.

1.09 SCAFFOLDING

.1 Construct and maintain scaffolding in rigid, secure, and safe manner in accordance with Section 01 52 00 – Construction Facilities.

.2 Erect scaffolding independent of walls. Remove promptly when no longer required.

1.10 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by the Departmental Representative and as needed to continue remediation work.

1.11 SIGNS AND NOTICES

.1 Signs and notices for safety and instruction are permitted and shall be in both official languages or graphic symbols conforming to CAN/CSA-Z321.

.2 Maintain approved signs and notices in good condition for duration of project and dispose of them off-site on completion of project or when directed by Departmental Representative.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED.

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-Z797-09 (R2014), Code of Practice for Access Scaffold.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

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

1.03 TEMPORARY FACILITIES PLAN

.1 In concert with and approval of Departmental Representative and CBSA, the Contractor shall prepare a Temporary Facilities Plan indicating locations of the following:

.1 Contractor's access, laydown and marshalling areas.

.2 Job trailers, toilets, first aid station, debris bins, storage sheds and site offices.

.3 Contractors' and staff parking.

.4 Temporary Hoarding and barriers.

.5 Temporary traffic routing, controls and diversion.

.6 Project signage.

1.04 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 Prepare hoarding plan indicating proposed dimensions, materials and interface with existing structures and maintained walkways and egress.

.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. Reinstate area to same state or better than before start of project.

1.05 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-Z797.

.2 Provide and maintain scaffolding, ladders, platforms and temporary stairs/ladders.

1.06 HOARDING AND ENCLOSURES

.1 In accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

1.07 HOISTING

.1 As required, provide, operate and maintain hoists for construction and cranes for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Lifts, hoists and cranes to be operated by qualified operator.

1.08 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

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

.3 Contractor(s) shall provide construction trailers for use as storage located in lay-down area.

.4 Storage space is limited to the lay-down area.

1.09 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work, and confined to area indicated in the drawings and Temporary Facilities Plan mutually agreed upon by the Departmental Representative and CBSA.

.2 Provide and maintain adequate access to project site.

.3 Clean areas where used by Contractor's equipment.

1.10 SECURITY

.1 PWGSC not responsible security of Contractor equipment and construction facilities.

1.11 OFFICES

.1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first aid room in a readily available location, in accordance with WCB requirements.

.3 Subcontractors to provide their own offices, as necessary. Direct location of these offices.

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 temporary portable sanitary facilities for work force in accordance with governing regulations and ordinances, to be located in lay-down area, and maintain in a sanitary, safe and secure manner.

Remove from site and make good at completion of the Work.

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

1.14 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations, and bylaws.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Refer to Section 01 14 00 – Work Restrictions.

1.16 CLEAN-UP

.1 In accordance with Section 01 74 11 – Cleaning, remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED.

.1 Not Used.

END OF SECTION

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1 GENERAL

1.01 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-O121-08(R2013), Douglas Fir Plywood.

1.02 INSTALLATION AND REMOVAL

.1 Prepare and submit hoarding plan indicating proposed dimensions, materials and interface with existing structures and maintained walkways and egress.

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

.3 Remove from site all such work after use and phased work is completed.

1.03 PEDESTRIAN AND BICYCLE WALKWAYS

.1 Provide temporary hoarding and lighting to allow for on-going operation of existing pedestrian walkways to/from the building Front Entry as indicated on drawings.

1.04 HOARDING FENCING

.1 Erect temporary site enclosure using self-supporting 1.8m metal fence, complete with opaque perforated fabric mesh screen.

.2 Provide temporary lighting as required in accordance with Section 01 51 00 – Temporary Utilities.

.3 Protect all fixtures (cameras, mirrors, conduits, and light fixtures) which are not removed during remediation work.

.4 Protect all connections for lighting and other fixtures temporarily removed.

.5 Provide 1.2m high barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.05 GUARD RAILS AND BARRICADES

.1 Provide as required by governing authorities.

1.06 ACCESS TO SITE

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

.2 Provide temporary pedestrian access through Landscape where indicated on the drawings:

.1 Remove existing boulders and store onsite for reinstatement after completion of the Work.

.2 Provide minimum 1.2m wide temporary walkway, constructed of 19mm thick green pressure treated plywood over 100x100mm pressure treated timber ‘joists’, supported as necessary to maintain a uniform surface connecting the two existing concrete sidewalks.

.3 Install granular roll roofing cap sheet over plywood to provide slip resistant finish, secured with roofing nails.

.4 Ensure smooth transition to existing concrete sidewalks, to facilitate accessibility.

.5 Remove and dispose of temporary walkway after completion of the Work. Reuse or recycle where facilities exist.

1.07 PUBLIC TRAFFIC FLOW

.1 Provide competent signal flag operators as required to perform Work and protect public.

.2 Provide and maintain traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.08 FIRE ROUTES

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

.2 Ensure access to the fire hydrant east of the Work is not compromised.

1.09 PROTECTION

.1 Protect surrounding areas and finishes from damage during performance of Work.

.2 Be responsible for damage incurred.

1.10 TURN OVER

.1 Remove hoarding at completion of the Work.

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

.3 Conduct final cleaning in accordance with Section 01 74 11 – Cleaning.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.1 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.02 PRODUCTS, MATERIALS AND EQUIPMENT

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

.2 Use products of one (1) manufacturer for material and equipment of the same type or classification unless otherwise specified.

.3 Unless otherwise specified, comply with manufacturer’s latest printed instructions for materials and installation methods.

.4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer’s instructions. Departmental Representative will designate which document is to be followed.

1.03 AVAILABILITY

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

.2 Immediately upon signing Contract, re-review product delivery requirements and confirm foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

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

1.04 STORAGE, HANDLING AND PROTECTION

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

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

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

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

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

1.05 TRANSPORTATION

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

1.06 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, apply, 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 Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, for Departmental Representative to establish course of action.

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

1.07 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 Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative 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 Departmental Representative, whose decision is final.

1.08 COORDINATION

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

.2 Be responsible for coordination.

1.09 REMEDIAL WORK

.1 Perform remedial work required to correct Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

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

1.10 FASTENINGS

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

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized (minimum Z275) steel fasteners and washers for securing exterior work, unless stainless steel or other material is specifically requested in affected Specification Section.

.1 After fasteners have been installed, protect with weather resistant coating.

1.11 PROTECTION OF EXISTING BUILDING AND WORK IN PROGRESS

.1 Protect existing building components and finishes from damage. Repair damaged components and finishes according to Departmental Representative's specifications, to better condition.

.2 Do not alter load bearing structural members without written approval of Departmental Representative.

1.12 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS FOR TENDERING

.1 Products are specified by 'Prescriptive' specifications: select any product meeting or exceeding specifications.

.2 Products specified under "Acceptable Products": select any one of the indicated manufacturers or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.

.3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.

.4 Products specified to meet particular design requirements or to match existing materials: use only material specified Acceptable Product.

.5 When products are specified by a referenced standard or by or performance specifications, upon request of Departmental Representative obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements at no cost to Departmental Representative.

.6 Provide cost in bid form for material and system included in bid.

1.13 SUBSTITUTION AFTER CONTRACT AWARD

.1 No substitutions are permitted without prior written approval of the Departmental Representative.

.2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution, including cut sheets and technical data.

.3 Proposals will be considered by the Departmental Representative if:

.1 Products selected by tenderer from those specified are not available;

.2 Delivery date of products selected from those specified would unduly delay completion of Contract, or

.3 Alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified and will result in a credit to the Contract amount.

.4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.

.5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative and the Contract price will be reduced accordingly.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 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.

.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 to on-going operations.

.7 Written permission of affected separate contractor.

.8 Date and time work will be executed.

1.02 MATERIALS

.1 Required for original installation.

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

1.03 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during remediation work.

.2 After uncovering, inspect conditions affecting performance of Work and review existing conditions with Departmental Representative.

.3 Beginning of work 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.

1.04 EXECUTION

.1 Temporarily remove and protect items required to complete Work.

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

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

.4 Prepare mock-ups as indicated in technical specifications.

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

.6 Execute Work by methods to avoid damage to other Work and finishes.

.7 Uncover prematurely installed Work as required to complete Work in correct construction sequence.

.8 Restore Work with new products in accordance with requirements of Contract Documents.

.9 Reinstall temporarily removed items to original locations and fit tight.

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

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

.12 Conceal pipes, ducts and wiring in ceiling construction of finished areas except where indicated otherwise.

.13 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5m in ambient light, and includes painting the whole surface to the next change in plane.

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for disposal in accordance with Section 01 74 19 –Waste Management and Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by CBSA or other Contractors.

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

.1 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative.

.2 Do not burn waste materials on site.

.3 Dispose of waste materials and recyclables at authorized facilities off site.

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

.3 Broom clean walkways daily. Remove snow and ice from access to the building.

.4 Provide adequate ventilation where required during use of volatile or noxious substances.

.5 Use only cleaning materials as recommended by product manufacturer.

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

.7 Dispose of waste materials and debris off site.

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

1.02 DEMOLISHED MATERIALS AND CONSTRUCTION WASTE

.1 The Contractor is responsible for ensuring that all materials are properly disposed of and that under no circumstances are demolished materials, construction waste, fasteners, connectors, and other similar items to be left in ceilings, cavities, pockets and voids.

1.03 FINAL CLEANING

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

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

.3 Clean reinstalled and previously protected items including light fixtures, security mirrors, and rainwater leaders. Confirm with Departmental Representative cleaning products to be used.

.4 Inspect finishes and reinstalled equipment and ensure specified workmanship and operation.

.5 Remove stains, spots, marks, dust, dirt and other disfiguration from all horizontal and vertical exterior surfaces, including from soffit and parapet cladding adjacent to the Work.

.6 Broom clean and wash parking areas, lanes and sidewalks affected by the Work.

.7 Clean roofs, downspouts, and drainage systems.

.8 Remove snow and ice from access to the building, and from within areas the hoarding. Excess snow is to be contained within the area.

1.04 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for disposal in accordance with Section 01 74 19 – Waste Management and Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 WASTE MANAGEMENT GOALS

.1 Prior to start of Work, conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.

1.02 DEFINITIONS

.1 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.2 Recycling: process of sorting, cleaning, 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.

.3 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Returning reusable items including pallets or unused products to vendors.

.4 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

1.03 MATERIALS SOURCE SEPARATION

.1 Where local recycling facilities readily available: before project start-up, prepare area and provide separate containers for re-usable and recyclable materials.

.1 Locate containers in locations to facilitate deposit of materials without hindering daily operations as directed by Departmental Representative.

1.04 STORAGE, HANDLING AND PROTECTION

.1 Store materials to be reused in secured location where directed by Departmental Representative.

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

.3 Protect, stockpile, store and catalogue items to be reused.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect existing structural components from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

1.05 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, paint thinner, coatings into waterways, storm, or sanitary sewers.

.3 Remove materials from surface remediation work as Work progresses.

.4 Use of Owners waste and recycling bins is not permitted.

1.06 USE OF SITE AND FACILITIES

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

.2 Maintain security measures as approved by Departmental Representative.

1.07 SCHEDULING

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

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 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 daily as work progresses.

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 07 27 13 – Self Adhesive Membrane.

.3 Section 07 42 43 – Composite Wall Panel System.

.4 Section 07 42 93 – Soffit Panel System.

.5 Section 07 52 00 – Modified Bitumen Roofing.

.6 Section 07 62 00 – Sheet Metal Flashings.

.7 Section 07 90 00 – Sealants.

.8 Section 09 91 13 – Exterior Painting.

.9 Section 09 96 00 – High Performance Coatings.

1.02 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor to conduct inspection of Work at completion and identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative review.

.2 Departmental Representative’s review:

.1 Departmental Representative and Contractor to review Work at completion of each Phase 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 reviewed for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.1 Submit for review colour digital images of corrected work referencing the corresponding Progress Observation Report item number.

.3 Work: complete and ready for final review.

.4 Final Review:

.1 When completion tasks are done, request final review of Work by Departmental Representative.

.2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-review.

.5 Declaration of Substantial Performance: when Owner Consultant considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period.

1.03 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 19 – Waste Management and Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

.1 Contractor to turnover lanes to Owner as work is completed with Substantial completion granted at end of project upon completion of all Work.

.2 Pre-warranty Meeting (End of Project):

.1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 – Project Meetings to:

.1 Verify Project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

.2 Departmental Representative 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.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Three (3) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two (2) final hard copies and one electronic copy of operating and maintenance manuals. Substantial completion will not be considered until this submission is completed.

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

1.03 OPERATING AND MAINTENANCE MANUALS

.1 Total performance will not be considered until this submission is complete.

.2 Binder Format:

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

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

.3 Arrange content by Section numbers and sequence of the Table of Contents according to the contract documents Table of Contents.

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

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

.4 As-Built Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages with drawing number and description visible.

.3 Contents:

.1 Table of Contents (for each volume), provide the following.

.1 Title of project.

.2 Date of submission

.3 Certificate of Substantial Completion.

.4 Contractor’s 1 year Warranty.

.5 Names, addresses, telephone numbers and email addresses of Consultant, Contractor and Sub-Contractors with name of responsible parties.

.6 Schedule of products and systems, indexed to content of volume.

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

.2 Photographic Report: of before and after conditions in accordance with Section 01 11 55 – General Instructions and Section 01 33 00 – Submittal Procedures.

.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.

.6 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

.4 Documents:

.1 Third Party Inspections and Manufacturers’ Reports: copies of all inspection and manufacturers’ reports where specified in technical sections.

.2 As-built contract drawings and shop drawings: record changes in red ink as work progresses legibly mark each item to record actual remediation work, including:

.1 Changes made by change orders.

.2 Change Orders and other modifications to Contract.

.3 Details not on original Contract drawings.

.4 References to related shop drawings and modifications.

.3 As-built contract specifications: legibly mark each item to record actual 'workmanship of construction', including:

.1 Manufacturer, trade name, and catalogue number of each 'Product/Material' installed, particularly optional items and substitute items.

.2 Changes made by addenda and change orders.

.4 Provide daily records of environmental conditions in accordance with Section 01 45 00 – Quality Control.

.5 Provide digital photos, if requested, for site records.

.6 Total performance will not be considered until this submission is completed.

.5 Operating and Maintenance Data:

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 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.

.3 Additional requirements: as specified in individual specifications sections.

.6 Warranties:

.1 Provide General Contractor's original signed 1 year warranty and Subcontractor's original warranties with an effective date as of Substantial Completion.

.2 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each original warranty with index tab sheets keyed in accordance with Specification Table of Contents.

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

.3 Obtain warranties executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of applicable item of work.

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

.1 Warranty Addressee Name.

.2 Project name.

.3 Project address.

.4 Warranty start date.

.5 Warranty period.

.5 Co-execute submittals when required.

.6 Retain warranties until time specified for submittal.

.7 Where project specific warranties are not available from manufacturers (with only generic warranties available), attach a copy of purchase invoice of materials.

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

.4 Conduct joint 9-month warranty inspection, measured from time of acceptance, by Departmental Representative.

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

.6 Written verification to follow oral instructions.

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

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 01 11 55 – General Instructions.

.2 Section 01 14 00 – Work Restrictions.

.3 Section 01 33 00 – Submittal Procedures.

.4 Section 01 74 19 – Waste Management and Disposal.

1.02 SECTION INCLUDES

.1 Methods for removal of existing concrete and asphalt pavement.

1.03 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Divert unused concrete and asphalt materials from landfill to local approved facility.

2 PRODUCTS

.1 Not used.

3 EXECUTION

3.01 PREPARATION

.1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of concrete and asphalt pavement to be removed.

.2 Schedule work generating construction noise levels which disrupt the processing of travelers during the low volume hours as determined by CBSA.

.3 Means and procedures of controlling and isolating other excessive or disturbing noise and vibration affecting occupied areas shall be the responsibility of the Contractor and approved by the Departmental Representative and CBSA.

3.02 PROTECTION

.1 Protect existing concrete and pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of the Consultant at no additional cost.

3.03 REMOVAL

.1 Remove existing concrete to lines and grades as indicated.

.2 Remove asphalt pavement by cold milling to depth of 38mm minimum, to area indicated.

.1 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.2 Prevent contamination of removed concrete and asphalt pavement by topsoil, underlying gravel or other materials.

.3 Provide for suppression of dust generated by removal process.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Structural Specifications.

1.02 REFERENCES

.1 CSA International

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit written demolition course-of-action plan:

.1 Submit for review and approval by Departmental Representative proposed method of demolition and site plan showing access points, bins and laydown area.

.3 Examine site and be familiar and conversant with existing conditions likely to affect work.

1.04 SITE CONDITIONS

.1 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Proceed only after receipt of written instructions have been received from Departmental Representative.

.2 Notify Consultant Departmental Representative before disrupting access or services.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 EXAMINATION

.1 Inspect building and site and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.02 PREPARATION

.1 Protection of In-Place Conditions:

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

.2 Keep noise, dust, and inconvenience to the Public and CBSA staff to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do Work in accordance with Section 01 35 33 - Health and Safety Requirements.

.2 Demolition/Removal:

.1 Remove items as indicated.

.2 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.3 Remove parts of existing materials to permit new construction.

.4 Trim edges of partially demolished building elements to suit future use.

.5 Separate waste materials for reuse, recycling and disposal in accordance with Section 01 74 19 - Waste Management and Disposal.

.6 Remove recycling containers and bins from site and dispose of materials at locally available and authorized facilities.

3.03 CLEANING

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

.1 Progress Cleaning: leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 03 20 00: Concrete Reinforcing.

.2 Section 03 30 00: Cast-in-Place Concrete.

.3 Section 32 12 16: Asphalt Paving.

.4 Section 32 16 15: Concrete Walks, Curbs and Gutters

1.02 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 Canadian Standards Association (CSA International):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA O86, Engineering Design in Wood.

.3 CSA O121, Douglas Fir Plywood.

.4 CSA 0141, Softwood Lumber.

.5 CSA O151, Canadian Softwood Plywood.

.6 CSA O153, Poplar Plywood.

.7 CSA O325.0, Construction Sheathing.

.8 CSA O437 Series, Standards for OSB and Waferboard.

.9 CSA S269.1, Falsework and Formwork

.3 American Concrete Institute (ACI):

.1 ACI 117, Specification for Tolerances for Concrete Construction and Materials.

.2 ACI 347, Guide to Formwork for Concrete.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:

.1 Show on drawings:

.1 Formwork design data: permissible rate of concrete placement and temperature of concrete in forms.

.2 Erection sequence.

.3 Stripping and re-shoring procedure.

.4 Camber.

.5 Locations of all construction and control joints in slabs and walls.

.6 For Architectural concrete, types of liners and ties, and tie layout.

.7 Equipment and procedure details when slip forming and / or flying forms are used.

.8 Shoring of composite steel beams and composite slabs on steel deck.

.9 Shoring of existing construction where required to carry construction loads.

2 PRODUCTS

2.01 MATERIALS

.1 Formwork materials: to CSA S269.1.

.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA O121, CSA 0141, CSA O437 or CSA-O153.

.2 For concrete with special architectural features, use formwork materials to CSA A23.1/A23.2.

.3 Form ties:

.1 Removable or internally disconnecting tie rods with or without spreader tubes, or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm (1") diameter in concrete surface.

.2 For Architectural concrete, use ties with plastic cones at each end.

.4 Form liner: high density overlay plywood to CSA O121 or other special materials to achieve the required concrete finish.

.5 Form stripping agent: colourless mineral oil, non-toxic, low VOC, free of kerosene, with viscosity between 15 to 24 mm²/s (70 and 110s Saybolt Universal) at 40°C, flashpoint minimum 150°C, open cup.

.6 Grooves, reglets and chamfers: White pine selected for straightness and accurately dressed to size.

.2 Falsework materials: to CSA S269.1.

3 EXECUTION

3.01 FABRICATION AND ERECTION

.1 Confirm to CSA A23.1.

.2 Fabricate and erect falsework in accordance with CSA S269.1.

.3 Do not place shores and mud sills on frozen ground.

.4 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.5 Fabricate and erect formwork in accordance with CSA S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.

.6 Make formwork tight and flush faced to prevent the leakage of mortar and the creation of unspecified fins or panel outlines.

.7 Form sides of footings unless Structural Drawings and Geotechnical report allow use of earth forms.

.8 See drawings for any camber required in hardened concrete. Measure cambers relative to member supports.

.9 Obtain Departmental Representative approval for formed openings, slots and chases not indicated on Structural Drawings.

.10 Provide water stops and keys around temporary openings in basement and retaining walls for shoring rakers or similar purposes.

.11 Do not permit loads from formwork to be transmitted to adjacent existing structure.

.12 Apply a form coating and release agent uniformly to the contact surface of formwork panels before reuse.

.13 Use 25 mm (1") chamfer strips on external corners and 25 mm (1") fillets at interior corners, unless specified otherwise.

.14 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated on Architectural and Structural drawings.

.15 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.16 Anchors and inserts not to protrude beyond surfaces designated to receive applied finishes, including painting.

.17 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

.18 Provide vertical dovetail anchor slots at 600 mm (2'-0") on centre where masonry veneer covers face of concrete.

.19 Build top form on sloping concrete where required to prevent concrete from flowing out of the form. Provide vents to allow air and bleed water to escape.

.20 Do not close wall forms before reinforcing steel has been reviewed by Departmental Representative.

.21 Where removable tie rods are used for form ties, plug and seal tie holes to maintain the fire resistance, gas impermeability, soundproofing and waterproofing of the adjacent concrete.

3.02 JOINTS

.1 Refer to Typical Details and Drawings Notes for locations, detailing and maximum spacing requirements of all concrete joints.

.2 Provide construction joints in formed slab and slab on deck.

.3 Provide expansion joints where shown on Structural Drawings. Remove all forming and filler material used during construction and provide clear space between structural elements equal to width specified.

.4 Provide construction gaps (closure strips) where shown on Structural Drawings.

.5 Refer to Section 03 30 00 for construction joints, sawcut joints and isolation joints in slab on grade and concrete toppings.

3.03 REMOVAL AND RESHORING

.1 Conform to CSA A23.1 and to ACI 347.

.2 Use pullout tests, on-site cured cylinders (kept beside and treated as the concrete in the structure they represent) or maturity tests to determine in-situ strength of concrete prior to removal of falsework. Do not locate pullout inserts on concrete surfaces exposed to view. Retain a testing company to supply, locate and test the inserts in accordance with ASTM C900.

.3 Maintain falsework supporting beams and slabs until concrete has reached at least 75% of its specified strength.

.4 Construction joints: maintain falsework supporting beams and slab adjacent to the construction joint until the concrete beyond the joint reaches at least 75% of its specified 28 day strength.

.5 Construction gaps: Do not remove falsework supporting beams and slabs adjacent to construction gaps until the gaps are filled and concrete in gaps has reached at least 75% of its specified 28 day strength.

.6 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 01 33 00: Submittal Procedures

.2 Section 03 10 00: Concrete Forming and Accessories.

.3 Section 03 30 00: Cast-in-Place Concrete.

.4 Section 32 12 16: Asphalt Paving.

.5 Section 32 16 15: Concrete Walks, Curbs and Gutters.

1.02 REFERENCES

.1 All referenced standards shall be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 American Concrete Institute (ACI)

.1 SP-66, ACI Detailing Manual 2004

.1 ACI 315, Details and Detailing of Concrete Reinforcement

.2 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures

.3 American Society for Testing and Materials International (ASTM)

.1 ASTM A 143/A 143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement

.2 ASTM A 185/A 185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

.3 ASTM A 497/A 497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete

.4 ASTM A 775/A 775M, Standard Specification for Epoxy-Coated Reinforcing Steel Bars

.5 ASTM A 325-06, Standard Specification for structural bolts, steel, heat treated 120/105 ksi minimum tensile strength

.4 Canadian Standards Association (CSA International):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA A23.3, Design of Concrete Structures.

.3 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.

.4 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.6 CAN/CSA- G30.18-M92 (R2002), Billet Steel Bars for Concrete Reinforcement, Grade 400W

.7 CAN/CSA- G30.114-M1983 (R1998), Welded Deformed Steel Wire Fabric for Concrete Reinforcement

.8 CAN/CSA- S16-01 (R2005), Limit State Design of Steel Structures

.9 CAN/CSA- W186-M1990 (R2002), Welding of Reinforcing Bars in Reinforced Concrete Construction

.10 CSA- W59-03, Welded Steel Construction (Metal Arc Welding)

.11 CSA-G40.20-04/CSA-G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel

.12 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles, A National Standard of Canada

.5 Reinforcing Steel Institute of Canada (RSIC):

.1 Reinforcing Steel Manual of Standard Practice.

.6 National Building Code of Canada 2015

1.03 QUALITY ASSURANCE

.1 Qualifications

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

.2 Shear stud reinforcing to be fabricated in an ICC ES approved facility.

1.04 QUALITY CONTROL

.1 Source Quality Control Submittals:

.1 Upon request, provide WSP-S with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.

.2 Upon request, inform WSP-S of proposed source of reinforcement material to be supplied.

.3 Upon request, provide WSP-S with a copy of plant certificate by the Concrete Reinforcing Steel Institute for epoxy coating of reinforcement.

.4 Upon request, provide WSP-S with a copy of manufacturer's instructions for patching factory applied epoxy coating.

1.05 SUBMITTALS

.1 Submittals in accordance with Section 01 33 01 – Submittal Procedures.

.2 Prepare reinforcement drawings in accordance with ACI 315.

.3 Submit shop drawings including placing of reinforcement and indicate:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.

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

.5 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Departmental Representative prior to its use.

.6 Quality Assurance: in accordance with Section 01 45 00 – Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.

.1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Upon request submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

1.06 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Place materials defined as hazardous or toxic in designated containers.

2 PRODUCTS

2.01 MATERIALS

.1 Reinforcing steel: carbon steel, deformed bars to CSA G30.18., unless indicated otherwise.

.2 Weldable Reinforcing steel: weldable low alloy steel deformed bars to CSA G30.18.

.3 Stainless Reinforcing steel: deformed bars to ASTM A955/A955M.

.4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.

.5 Welded steel wire fabric: to ASTM A1064/A1064M. Provide in flat sheets only.

.6 Epoxy Coating of reinforcement: to ASTM A775/A775M.

.7 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.

.8 Mechanical splices: to concentrically align bars and develop specified tensile strength of rebar. Threaded couplers to have plastic internal coupler thread protectors.

.9 Rebar terminators: oversized taper-threaded couplings capable to develop specified tensile strength of rebar; area to be not less than 5 times the rebar area.

.10 Plain round bars: to CSA G40.20/G40.21.

.11 Shear stud reinforcing: per ASTM A1044. Min yield strength for studs – 350 MPa, for rails – 300 MPa.

.12 Expansion cap for dowels at expansion / contraction joints: plastic, tight fitting, with internal pin to locate dowel and create void for expansion.

2.02 MATERIALS (NON-STRUCTURAL)

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

.2 Reinforcing steel: billet steel, grade as specified on contract drawings deformed bars to CAN/CSA-G30.18 grade 400W, unless indicated otherwise.

.3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.16.

.4 Cold-drawn annealed steel wire ties: to CSA G30.3.

.5 Deformed steel wire for concrete reinforcement: to CSA G30.14.

.6 Welded deformed steel wire fabric: to CSA G30.15.

.1 Provide in flat sheets only.

.7 Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A 775M.

.8 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m².

.1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.

.2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.

.1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.

.3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.

.1 In this case, no restriction applies to temperature of solution.

.4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.

.1 Provide product description as described in PART 1 – SUBMITTALS

.5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1.

.6 Mechanical splices: subject to approval of Departmental Representative.

.7 Plain round bars: to CSA-G40.20/G40.21.

2.03 FABRICATION (NON-STRUCTURAL)

.1 Fabricate reinforcing steel in accordance with CSA-A23.1 and ACI 315

.1 ACI 315R unless indicated otherwise.

.2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.04 SOURCE QUALITY CONTROL (NON-STRUCTURAL)

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

3 EXECUTION

3.01 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice.

.2 Fabricate epoxy coated reinforcing steel in accordance with ASTM D3963/D3963M. Plants to be certified by the CRSI for epoxy coated steel. Provide colour to contrast sharply with reinforcing steel and rust colour.

.3 Stagger mechanical splices 750 mm (2'-6") unless otherwise noted on drawings.

.4 Weld reinforcement in accordance with CSA W186 where indicated.

.5 Fabricate shear stud reinforcing according to CSA W59. Weld studs to rail to develop.

.6 Ship bundles of bar reinforcement, clearly identified in accordance with bar lists.

.7 Provide standard hooks at ends of all hooked bars.

.8 Substitute different size bars only if permitted in writing by WSP-S.

3.02 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by WSP-S.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure. Use tools which will limit bend radii to the values given in CSA A23.1.

.3 Where key-creating stay form with pre-installed blind dowels is used, bend the dowels out using special tools approved by the stay form manufacturer.

.4 Replace bars which develop cracks or splits.

3.03 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated reinforcing steel with compatible finish to provide continuous coating.

3.04 PREPARATION (NON-STRUCTURAL)

.1 Galvanizing to include chromate treatment.

.1 Duration of treatment to be 1 hour per 25 mm of bar diameter.

.2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A 143/A 143M.

3.05 FIELD BENDING (NON-STRUCTURAL)

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

3.06 PLACING REINFORCEMENT (NON-STRUCTURAL)

.1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA- A23.1/A23.2.

.2 Use plain round bars as slip dowels in concrete

.1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.

.2 When paint is dry, apply thick even film of mineral lubricating grease

.3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

.4 Minimum concrete cover to reinforcing steel, unless shown otherwise in the drawings:

.1 faces cast and permanently exposed against earth = 75mm

.2 inside faces of walls = 50mm

.3 slabs and other formed walls = 40mm

.5 Ensure cover to reinforcement is maintained during concrete pour.

.6 Protect coated portions of bars with covering during transportation and handling.

.7 Development length as follows, unless shown otherwise in the drawings:

	Uncoated Vertical Bars	Uncoated Horizontal Bars
10M	300mm	350mm
15M	400mm	500mm
20M	550mm	700mm

.8 Lap splices shall be staggered with minimum lap length as follows unless shown otherwise in the drawings:

	Uncoated	Uncoated Top Bars
10M	350mm	450mm
15M	500mm	600mm

20M	700mm	900mm

.9 Splices shall be staggered so that no more than 50% of the reinforcing is spliced at any one location, unless shown otherwise on the drawings.

.10 All exposed edges of concrete to be chamfered 19mm.

3.07 FIELD TOUCH UP (NON-STRUCTURAL)

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 03 10 00: Concrete Forming and Accessories.

.2 Section 03 20 00: Concrete Reinforcing.

.3 Section 03 35 00: Concrete Finishing.

.4 Section 32 13 13: Asphalt Paving.

.5 Section 32 16 00: Concrete Walks, Curbs and Gutters.

1.02 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 American Society for Testing and Materials International (ASTM) SP-66, ACI Detailing Manual 2004

.1 ASTM C 260, Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C 309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C 494/C 494M, Standard Specification for Chemical Admixtures for Concrete.

.4 ASTM D 1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.5 ASTM D 1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

.3 Canadian Standards Association (CSA International):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A283, Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.4 CSA S413, Parking Structures.

.5 CAN3 – A5-M1983, Portland Cements.

.4 Canadian General Standards Board (CGSB):

.1 CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

1.03 CERTIFICATION (NON-STRUCTURAL)

.1 Minimum 2 weeks prior to starting concrete work submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:

.1 Portland cement.

.2 Blended hydraulic cement.

.3 Supplementary cementing materials.

.4 Grout.

.5 Admixtures.

.6 Aggregates.

.7 Water.

.8 Waterstops.

.9 Waterstop joints.

.10 Joint filler.

.2 Provide certification from Materials Representative that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1

.3 Provide certification from Materials Representative that mix proportions selected will produce concrete of specified quality, durability and yield and that strength will comply with CAN/CSA-A23.1.

1.04 CONSTRUCTION QUALITY CONTROL (NON-STRUCTURAL)

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

.3 Submit proposed quality control procedures for Departmental Representative's approval. Submit in accordance to 01 33 00 – Submittal Procedures.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Minimum 2 weeks prior to starting concrete work, submit all concrete mix designs, and indicate where each concrete mix is to be used.

.3 Minimum 2 weeks prior to placing concrete, submit drawings showing proposed locations of all construction and control joints (including wall and slab on grade control joints) for Departmental Representative review and approval.

.4 Provide composite sleeving drawings showing sleeves required by all trades.

.5 Provide composite layout drawings showing all cast in place pipes and conduits.

.6 Minimum submission requirements for each concrete mix design shall include the following:

.1 Minimum specified compressive strength at 28 days (or at the time specified on drawings).

.2 Maximum aggregate size.

.3 Aggregate type (if not normal density).

.4 Concrete density range, wet and dry (if not normal density).

.5 CSA exposure class.

.6 Cement type (if not type GU).

.7 Percentage and type of supplemental cementing materials.

.8 Maximum water/cementitious materials ratio.

.9 Assumed method of placement of concrete.

.10 Corrosion inhibitor (name and quantity, if applicable).

.11 Plastic or steel fibres (type, name and quantity, if applicable).

.12 Alkali-aggregate resistance.

.13 Architectural requirements (colour of cement and aggregate, if applicable).

.14 Maximum time from batching to placing concrete (if retarding admixtures are used).

.7 Concrete pours: provide accurate records of all concrete pours marked on a set of Structural Drawings.

.8 Flatness and levelness: when requested, submit measurements of slab tolerances for each concrete pour..

.9 On completion of the works, provide written report to Departmental Representative certifying that the concrete in place meets performance requirements.

2 PRODUCTS.

2.01 DESIGN CRITERIA

.1 To CSA A23.1/A23.2, Alternative 1 – Performance, and as described under Mixes and on Structural Drawings.

2.02 PERFORMANCE CRITERIA

.1 Concrete supplier to meet the concrete performance criteria established by Departmental Representative and to provide verification of compliance.

2.03 MATERIALS

.1 Portland cement: to CSA A3001.

.2 Cementitious hydraulic slag: to CSA A3000.

.3 Fly ash: to CSA A3001, Type CI.

.4 Water: to CSA A23.1.

.5 Aggregates: to CSA A23.1/A23.2. Do not use recycled concrete as aggregate.

.6 Admixtures: not to contain chlorides.

.7 Corrosion-inhibiting admixture: calcium nitrite solution.

.8 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2. Minimum compressive strength: 40 MPa at 28 days.

.9 Premoulded Joint Fillers (expansion joint): Bituminous impregnated fibre board: to ASTM D1751

2.04 CONCRETE MIXES

.1 Use ready-mix concrete. Proportion concrete in accordance with CSA A23.1, Alternative 1 - Performance Method for Specifying Concrete.

.2 Set performance characteristics of concrete in plastic state in coordination with all trades involved.

.3 Meet performance criteria of concrete in hardened state as shown on Structural Drawings and provide verification of compliance.

.4 Do not use admixtures containing chlorides.

2.05 MATERIALS (NON-STRUCTURAL)

.1 Portland Cement: to CAN/CSA-5.

.2 Supplementary Cementing Materials: to CSA-A23.5.

.3 Water: to CSA-A23.1.

.4 Aggregates: to CAN/CSA-A23.1.

.5 Air entraining admixture: to CAN/CSA-A266.1.

.6 Chemical admixtures: to CAN/CSA-A266.2. Departmental Representative to approve acceleration or set retarding admixtures during cold and hot weather placing.

.7 Grout:

.1 Provide grout certification prior to use.

.2 To be as specified in Contract Documents. Alternative to be approved by Departmental Representative.

.3 Use in accordance with manufacturer's recommendations.

.8 Curing Compound:

.1 To be spray applied, liquid type conforming to ASTM C309 containing a fugitive dye.

.2 To be applied in accordance with manufacturer's recommendations.

.3 Other curing methods such as sheet material and burlap mats, subject to Departmental Representative's approval.

.9 Premoulded Joint Fillers (expansion joint): Bituminous impregnated fibre board: to ASTM D1751

2.06 CONCRETE MIXES (NON-STRUCTURAL)

.1 Proportion concrete in accordance with CAN/CSA-A23.1, Table 11. Alternative 1 and to specific design criteria specified on Contract Drawings.

2.07 FORMS (NON-STRUCTURAL)

.1 Forms to CAN/CSA-A23.1.11.

.2 Free from surface defects for all concrete faces exposed to view.

.3 Form ties to be metal and of type such that no metal left within 25mm of concrete surface when forms removed.

2.08 FORM RELEASE AGENT (NON-STRUCTURAL)

.1 Non-staining material type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap

3 EXECUTION

3.01 PREPARATION

.1 Provide advanced notice as indicated on drawings to allow Departmental Representative field review of reinforcing prior to placing of concrete/closing of wall forms.

.2 Obtain Departmental Representative written approval before placing concrete.

.3 Remove water and disturbed soil from excavations before placing concrete.

.4 Before placing slab-on-grade, confirm that subgrade and backfill meet specifications and are free of frost and surface water.

.5 Provide bondbreaker under unbonded concrete topping. Attach to base slab, lap min. 150 mm (6") and seal.

.6 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

3.02 INSTALLATION/APPLICATION

.1 Set sleeves, conduits, pipe hangers, weep hole tubes, drains and other inserts and openings as indicated or specified elsewhere.

.2 Refer to Typical Details and Drawing Notes for placing guidelines, maximum size and minimum spacing of sleeves, embedded pipes and conduits.

.3 Check locations and sizes of sleeves and openings shown on Structural Drawings with Architectural Drawings. Notify Departmental Representative of any discrepancies.

.4 Obtain Departmental Representative approval for any required sleeves and openings which are not shown on Structural Drawings or reviewed sleeving drawings.

.5 Set special inserts for strength testing as required for non destructive method of testing concrete.

.6 Set anchor rods using templates under supervision of appropriate trade prior to placing concrete. Locate each anchor rod group to within 6 mm (1/4”) of required location.

.7 Refer to Section 03 10 00 for construction joint requirements.

3.03 PLACING CONCRETE

.1 Place concrete in accordance with CSA A23.1.

.2 Delivery and place concrete with minimum re-handling.

.3 If concrete is pumped or placed pneumatically, control discharge velocity to prevent separation or scattering of concrete mix ingredients.

.4 Place concrete in a continuous operation without cold joints. If cold joints develop inadvertently, notify Departmental Representative to obtain instructions for required remedial work.

.5 Where higher strength concrete needs to be puddled in slabs above columns and walls, place adjacent lower strength slab concrete within 30 minutes of pouring the puddled concrete.

.6 Do not overload forms.

.7 Use rubber tipped vibrators for concrete containing epoxy coated reinforcement.

.8 Cast slabs and beams at least two hours after casting the supporting columns and walls.

.9 Cast slabs with a top surface that is level or sloping as required by the Drawings. Allow for cambering where required.

.10 Where steel beams are used, ensure that slab thickness is as specified. Measure from top of steel to control thickness.

.11 Concrete exposed to view:

.1 Exposed surfaces to be dense, even, uniform in colour, texture and distribution of exposed aggregate.

.2 Defects such as honeycombing, voids, loss of fines, visible flow lines, cold joints or excessive bug holes may be cause for rejection at the discretion of the Architect.

.12 Maintain accurate records of all poured concrete including extent, date and location of each pour, concrete mix used, ambient air temperature, test samples taken and falsework removal date and mark on a set of Structural Drawings.

3.04 FINISHING CONCRETE

.1 Finish concrete to CSA A23.1/A23.2.

.2 Cooperate with any trade applying finishes to concrete surfaces and provide surfaces which will ensure adequate bond. Provide chases and reglets where required.

.3 Finishing Formed Surfaces:

.1 Completely fill holes left by through-bolts with grout.

.2 Do not patch surfaces until instructed in writing by Departmental Representative.

.3 Concrete exposed to view:

.1 Provide smooth-form finish.

.2 Rub exposed sharp edges with carborundum to produce 3 mm (1/8") radius edges unless otherwise indicated.

.4 Architectural Concrete:

.1 Refer to Architectural drawings for concrete elements which are considered Architectural Concrete.

.2 Final appearance of architectural concrete is as important a factor as the engineering properties of the concrete and failure of the as-cast concrete to meet the required standard of appearance may be cause for rejection at the discretion of the Architect.

.3 Do not patch surfaces unless instructed in writing by Departmental Representative. All patches must match colour and texture of adjacent concrete to approval of the Architect.

3.05 CONCRETE CURING AND PROTECTION

.1 At a minimum cure and protect concrete in accordance with CSA A23.1

.2 Extend curing and protection period until concrete has reached following strength levels for structural safety:

.1 Framed slabs and beams: 75% of specified 28 day strength.

.2 Columns, walls, piers and footings: 50% of specified 28 day strength

.3 For concrete containing supplementary cementing materials, curing and protection times may need to be extended beyond those outlined by CSA A23.1 to achieve the required structural properties.

.4 Concrete exposed to view:

.1 Protect during construction period from wear, damage, marking, discolouration, staining and becoming coated with concrete leakage.

.2 Unless rejected, repair damage and remove marks and stains to the approval of the Architect.

.5 Do not load concrete until sufficient strength is developed.

3.06 SLABS ON GRADE

.1 Construction joints and control joints:

.1 Refer to Notes on Structural Drawings for maximum spacing requirements.

.2 Saw cut control joints to depth equal to one quarter of the concrete thickness u/n. Alternatively, for slabs on grade not exposed to view or vehicle traffic, create control joints by inserting pre-assembled “T” shaped plastic joints into fresh concrete; remove top part prior to concrete finishing.

.3 Locate joints on column lines wherever possible and on intermediate lines, which result in approximately square panels, without re-entrant corners.

.4 Do not create “L” shaped panels nor “T” shaped joint intersections.

.5 Protect edges of sawcuts from breakage.

.6 Clean out sawcuts in concrete exposed to view or vehicle traffic and fill with control joint filler after concrete is at least 120 days old.

.7 Sawcut top 25 mm (1") at construction joints in exposed concrete for a width of 5 mm (3/16") and fill with control joint filler after concrete is at least 120 days old. Alternatively, form construction joint with a 5mm (3/16”) thick chamfer strip at top. Depth of the strip to be at least equal to ¼ of slab thickness.

.8 Clean out sawcuts in other concrete and fill with a sand-cement paste one month prior to installing floor coverings.

.2 Isolation Joints:

.1 Unless otherwise shown on structural drawings, provide min.10 mm (3/8”) thick pre-moulded joint filler of the same depth as the thickness of the concrete wherever slabs-on-grade abut foundation walls, columns and piers. Omit if slab is chased or dowelled into structure.

.2 Furnish filler for each joint in single piece for depth and width required for joint.

.3 When more than one piece of filler is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Cracks in Slabs-on-Grade:

.1 Extensive cracking of slabs-on-grade or cracks in excess of 3 mm (1/8”) in width may be cause for rejection of slab or portion of slab at the Architect’s discretion.

.2 Protect edges of cracks in slabs-on-grade from breakage.

.3 Exposed slab on grade: Unless slab is rejected, repair cracks that are over 0.4 mm (0.016") wide:

.1 Fill cracks with a sand-cement grout after concrete is at least 120 days old.

.2 Seven days later, cut out top 20 mm (3/4") of crack for a width of 5 mm (3/16") and fill with control joint filler.

.4 Architectural slab on grade: Unless slab is rejected, repair cracks that are over 0.2 mm (0.008") wide:

.1 Fill cracks with epoxy after concrete is at least 180 days old.

.2 Take all measures necessary to prevent epoxy on surface of exposed slab.

.3 Have manufacturer’s technical representative present during initial repairs.

3.07 UNBONDED CONCRETE TOPPINGS

.1 Place unbonded concrete topping over bondbreaker.

.2 Provide construction, control and isolation joints same as specified for slab on grade.

3.08 BONDED CONCRETE TOPPINGS

.1 Place bonded topping over hardened concrete base slab in accordance with CSA A23.1.

.2 Not less than 24 hours prior to applying concrete toppings, remove all laitance, dirt, dust, debris, grease, or other substances that would interfere with the bond between the base slab and the topping using one or more of the following methods:

.1 Wet or dry grit sand-blasting.

.2 High-pressure water-blasting.

.3 Mechanical removal by scarifiers, scabblers, or grinding wheels.

.3 Notify Departmental Representative before placement of each topping.

.4 Bond topping to base slab using an epoxy bonding agent or cement/sand grout procedure.

.5 Provide joints in topping to match locations of those in base slab.

3.09 PENETRATING SEALER

.1 Concrete to receive penetrating sealer to be at least 28 days old.

.2 Surfaces to be treated with the sealer to be dry and free of dirt and other contaminants.

.3 Completely remove all curing compounds before the sealer application.

.4 Follow manufacturer's recommendations for coverage rate and application procedure.

.5 Do not apply in inclement weather or if ambient air temperature or concrete surface temperature is less than 5ºC or more than 38ºC.

3.10 GROUTING UNDER BASE PLATES AND BEARING PLATES

.1 Grout under base plates and bearing plates using procedures in accordance with manufacturer's recommendations.

.2 Provide 100% contact over grouted area.

.3 Grout column base plates and beam bearing plates as soon as steelwork is completed.

.4 Do not add load on steelwork until grouting is completed and grout strength has reached at least 20 MPa.

3.11 GENERAL (NON-STRUCTURAL)

.1 Do cast-in-place concrete work, including surface tolerances, finishing and field quality control, in accordance with CAN/CSA-A23.1 except where specifically stated otherwise

3.12 FORMWORK (NON-STRUCTURAL)

.1 Formwork to conform to shape, lines and dimensions shown on Contract Drawings.

.2 Formwork to be substantial, sufficiently tight to prevent leakage of mortar and braced and tied to maintain position and shape.

.3 Formwork to be unlined unless specified otherwise.

3.13 CONSTRUCTION (NON-STRUCTURAL)

.1 Obtain Departmental Representative's approval before placing concrete. Providing minimum 24h notice prior to placing of concrete.

.2 Pumping of concrete is permitted only after Departmental Representative's approval of equipment and mix.

.3 Ensure reinforcement and inserts are not disturbed during concrete placement.

.4 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.

.5 Ensure placement and compaction procedures to CAN/CSA-A23.1 and to approval of Departmental Representative.

.6 Protect exposed surfaces from weather and vandalism during initial set period.

.7 Strip forms ensuring no damage to concrete.

.8 Ensure curing procedures consistent with weather and temperature conditions.

.9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.10 Do not place load upon new concrete until authorized by Departmental Representative.

3.14 JOINT FILLERS (NON-STRUCTURAL)

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless authorized otherwise by Departmental Representative. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.2 Locate and form all joints as shown on Contract Drawings or as otherwise require. Install joint filler where applicable.

.3 Use 13mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to finished slab surface unless indicated at bottom.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 03 30 00 – Cast-in-Place Concrete

.2 Section 32 16 15 – Concrete Walks, Curbs and Gutters

1.02 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.2 CSA International

.1 CAN/CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction//Methods of Test for Concrete.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.

1.04 ENVIRONMENTAL REQUIREMENTS

.1 Temporary lighting:

.1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.

.2 Electrical power:

.1 Provide sufficient electrical power to operate equipment normally used during construction.

.3 Work area:

.1 Make work area water tight protected against rain and detrimental weather conditions.

.4 Temperature:

.1 Maintain ambient temperature of not less than 10 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.

.5 Moisture:

.1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.

.6 Safety:

.1 Comply with WorkSafe BC.

.7 Ventilation:

.1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.2 Provide continuous ventilation during and after coating application.

1.05 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:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Waste Management: in accordance with 01 74 19 - Waste Management Disposal.

2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

.1 Product quality and quality of work in accordance with Section 01 61 00 - Product Requirements.

2.02 CHEMICAL HARDENERS

.1 Non-metallic hardener: premixed, aggregate type, dry shake surface hardener, cement to hardener ratio 2 to 1, cement colour as indicated.

2.03 SEALING COMPOUNDS

.1 Surface sealer: to CAN/CGSB-25.20, Type 2 - water based, clear.

.2 Sealants: maximum VOC limit.

2.04 CURLING COMPOUNDS

.1 Select low VOC, water-based, curing compounds.

2.05 MIXES

.1 Mixing ratios in accordance with manufacturer's written instructions.

3 EXECUTION

3.01 EXAMINATION

.1 Verify that substrate surfaces are ready to receive work indicated.

3.02 PREPARATION OF EXISTING SLAB

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.

.2 Saw cut control joints to CAN/CSA-A23.1, 24 hours maximum after placing of concrete.

.3 Use strong solvent mechanical stripping to remove chlorinated rubber or existing surface coatings.

.4 Use protective clothing eye protection respiratory equipment during stripping of chlorinated rubber or existing surface coatings.

3.03 FINISHING

.1 Finish formed surfaces:

.1 Completely fill holes left by through-bolts with grout.

.2 Do not patch surfaces until instructed in writing by Departmental Representative.

.3 Concrete exposed to view:

.1 Provide smooth-form finish.

.2 Rub exposed sharp edges with carborundum to produce 3 mm (1/8") radius edges unless otherwise indicated

.2 Surfaces of exposed concrete to be finished as follows:

.1 To match existing:

.1 Curbs and signage base: trowelled smooth.

.2 Sidewalks: broomswept, with trowelled or sawcut crack control to match existing.

3.04 COATING APPLICATION

.1 Apply concrete finishing floor hardener to all exposed floors.

.2 In locations where floors may be subjected to vehicular traffic, it shall be slip resistant, have high abrasion and impact resistance to withstand frequent wheeled traffic with high point loading. It shall also be resistant to chemicals related to regular snow and ice removal

.3 Apply floor hardener in accordance with manufacturer's written instructions, and CSA-A23.1-94, Concrete Materials and Methods of Construction

.4 Clean over spray, and clean sealant from adjacent surfaces.

3.05 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: in accordance with 01 74 19 – Waste Management and Disposal.

3.06 PROTECTION

.1 Protect finished installation in accordance with manufacturer's instructions.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 03 30 00: Cast in Place Concrete.

.2 Section 05 50 00: Metal Fabrications.

.3 Section 09 96 00: High Performance Coatings.

1.02 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 Canadian Standards Association (CSA International):

.1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA S16, Limit States Design of Steel Structures.

.3 CSA S136, North American Specifications for the Design of Cold Formed Steel Structural Members.

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

.5 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.

.6 CSA W55, Certification of Companies for Resistance Welding of Steel and Aluminum.

.7 CSA W59, Welded Steel Construction (Metal Arc Welding).

.8 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA):

.1 CISC Handbook of Steel Construction.

.2 CISC/CPMA Standard 2-75, Quick-drying Primer for Use on Structural Steel.

.4 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International:

.1 NACE No. 3 / SSPC-SP 6, Commercial Blast Cleaning.

1.03 QUALITY ASSURANCE

.1 Qualifications

.1 Structural steel fabricator to be a certified member of the Canadian Institute of Steel Construction and to have at least five year experience with structural steel for buildings.

.2 Structural steel fabricator and erector to be certified by the Canadian Welding Bureau under the requirements of CSA W47.1, Division 1 or 2 for fusion welding and/or CSA W55.3 for resistance welding of structural steel components, and to have CWB approved procedure for welding rebar (Grade 400W) to structural steel.

.3 Welders to be CWB approved, working under supervision of a CWB approved firm.

1.04 QUALITY CONTROL

.1 Source Quality Control Submittals:

.1 Provide all submittals 4 weeks prior to starting fabrication of structural steel.

.2 Mill test reports:

.1 Mill test reports to include ladle analysis and physical test results, and to show chemical and physical properties and other details of steel to be incorporated in project.

.2 The reports to be correlated to the materials or products to which they pertain

.3 In addition to mill testing, each batch of structural steel (including bolts) manufactured outside United States, Canada, Great Britain and EU countries must also be tested in Canada by an ISO 17025 certified testing laboratory. In addition to compliance with all the relevant CSA and ASTM requirements, the testing must show that the maximum boron content in structural steel does not exceed 0.0008%.

.4 For rolled shapes with flanges 40 mm (1 ½") or thicker and for plates over 51 mm (2") in thickness used for members which are parts of seismic force resisting system, submit Charpy V-notch impact test values to demonstrate compliance with the requirements of CSA S16.

.2 Tolerances

.1 Conform to the fabrication and erection tolerances of CAN/CSA S16.

.2 Comply with more stringent tolerances if specified elsewhere to suit interfacing materials or AESS members

1.05 ACTION AND INFORMATIONAL SUBMITTALS

.1 Shop Drawings:

.1 If additional information is required from Departmental Representative, allow a minimum of five working days for Departmental Representative to review and respond to the request for information.

.2 It is advisable to submit erection diagrams for review before preparing shop details. Copies of plans and section details developed by Departmental Representative will not be accepted as erection diagrams.

.2 Erection drawings:

.1 Submit erection drawings indicating details and information necessary for assembly and erection purposes including:

.1 Description of erection methods.

.2 Sequence of erection.

.3 Temporary bracings.

.2 Provide setting drawings showing dimensions and details for placing steel assemblies which are set in concrete,

.3 Fabrication drawings:

.1 Submit fabrication drawings showing designed assemblies, member sizes, components and connections. Show on drawings:

.1 Material specifications.

.2 Surface preparation.

.3 Shop painting / galvanizing.

.4 Section splices.

.5 Types of shop and field connections.

.6 Net weld lengths.

.7 Precautions which will be taken to exclude threads from shear planes of bearing type bolted connections (where applicable).

.2 Show details by which steel assemblies, which are set in concrete, are to be connected to the formwork.

.3 Substitution of alternative sections will only be allowed provided the new members have equal or greater capacity and stiffness and their dimensions are approved by Departmental Representative.

.4 Provide technical specifications for all sliding bearing assemblies.

2 PRODUCTS

2.01 DESIGN AND DETAILING REQUIREMENTS

.1 Design details and connections in accordance with requirements of CSA S16 and CSA S136 to resist forces and to allow for movements indicated. Consider load effects due to fabrication, erection and handling.

.2 Connection design to include consideration of all pass-through forces, including tension, compression, moment and shear. Provide local reinforcement at connection or joint as required.

.3 Follow conceptual connection details if shown on structural drawings. Do not change without Departmental Representative written approval. If welds are defined on drawings, the sizes shown are minimum requirements which might need to be increased to suit connection design.

.4 Increase specified section thickness at no extra cost if required for fabrication (bending) or galvanizing. Alternatively, build up curved sections from plates.

.5 Assume that bolt threads are intercepted by shear plane, unless special measures are indicated on shop drawings to exclude threads from shear plane.

.6 Beams:

.1 Select beam end connections from CISC "Handbook of Steel Construction" when connection for shear only (standard connection) is required.

.2 Typical beam to spandrel beam and beam to column connections to be two sided or end plate connections.

.3 Select or design beam end connections for factored shear indicated on plans.

.4 When shears are not indicated, select or design non composite beam end connections to resist reaction due to maximum uniformly distributed load capacity of the beam in bending.

.5 End bearing connections of inclined members to have horizontal bearing plane at supported member.

.6 For beams continuous over supports and for beams supporting columns, provide min. 6 mm (1/4”) stiffener plates at each side of web at point of concentrated load, unless thicker stiffeners are required by connection design or different details are shown on drawings.

.7 Columns:

.1 In addition to all other loads, connect columns to base plates to transfer horizontal load equal to 2% of the column vertical load.

.2 In addition to all other loads, connect columns to base plates to transfer tensile load equal to the capacity of all anchor bolts,

.3 Provide connection for tie joist bottom chord at all columns supporting joists; coordinate with joist supplier.

.4 Provide diagonal or cantilevered angles at sides of columns where required to support deck or slab.

.5 Provide cap plates at tops of columns where required for support of deck, slab, joists, beams or roof anchors.

.8 Provide slotted holes long enough to allow for deflection indicated on drawings plus construction tolerance, assuming bolts are centred in slots. Bolts are to be finger-tight with burred threads to allow for movement during the life of structure without bolts loosening.

.9 Do not oversize anchor rod holes for site tolerances. Use hole sizes suggested in the CISC Handbook of Steel Construction.

.10 Design and proportion welded and bolted connections at crane girders and at columns supporting them in accordance with the fatigue requirements of CSA S16 to be able to sustain 2,000,000 cycles of load.

.11 Connect new steel members to existing concrete using drilled concrete anchors, refer to Post Installed Anchors and Dowels notes on drawings. Do not field weld at connections with adhesive anchors.

.12 Provide closure plates for all exposed and for all exterior tubular members.

2.02 MATERIALS

.1 Structural steel:

.1 Rolled shapes: to CSA G40.21 or ASTM A992, refer to drawings.

.2 Hollow structural sections: to ASTM A500, ASTM A1085 or CSA G40.21, refer to drawings.

.3 Structural pipe: to ASTM A53.

.2 Anchor rods: CSA G40.21, or ASTM 1554, refer to drawings.

.3 Bolts, nuts and washers: to ASTM F3125, grade A325.

.4 Load indicating washers: to ASTM F959.

.5 Weldable reinforcing steel: to CSA G30.18, deformed bars.

.6 Welding materials: to CSA W48 and CSA W59, certified by Canadian Welding Bureau. For members in seismic force resisting system, refer to additional brittleness requirements in CSA S16.

.7 Shop paint: to CISC/CPMA 1-73a.

.8 Shop paint primer: to CISC/CPMA 2-75, solvent reducible alkyd, red oxide, compatible with specified topcoat.

.9 Zinc-rich coating: to SSPC Paint Specification No.20, compatible with top coat (where specified).

.10 Hot dip galvanizing: to ASTM A123/A123M, minimum zinc coating of 600 g/m².

.11 Epoxy coating: pre-mixed, 2 components, high-solids (volume of solids 87 ±3%), self-priming,

.12 Joint filler for exposed steelwork: Epoxy resin.

2.03 FABRICATION

.1 Fabricate structural steel in accordance with CSA S16 and with reviewed shop drawings.

.2 Install shear studs in accordance with CSA W59.

.3 Continuously seal hollow members exposed to weather by intermittent welds and plastic filler unless continuous welds are indicated on drawings.

.4 HSS members which require galvanizing to either be per CSA G40.21, grade 350W, Class H, or to be stress relieved prior to galvanizing.

.5 Complete welded shop connections prior to galvanizing.

.6 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When steel is to be left unpainted, place marking at locations not visible from exterior.

.7 Match marking: shop mark bearing assemblies and splices for fit and match.

2.04 SHOP PAINTING

.1 Refer to Section 09 96 00 High Performance Coatings

.2 Clean all members to SSPC-SP 1 – Solvent Cleaning, followed by SSPC-SP 6 Commercial Blast Cleaning, Remove loose mill scale, rust, oil, dirt and foreign matter using any suitable method.

.3 Apply one coat of shop paint CISC/CPMA 1-73a to steelwork in the shop with the exception of:

.1 Members to receive a finish coat of paint on site for which a CISC/CPMA 2-75 shop primer is required.

.2 Members to receive intumescent coating for which a compatible shop primer is required.

.3 Members to receive zinc-rich coating.

.4 Galvanized members.

.5 Shear connectors and top flanges of composite beams with field welded shear connectors.

.6 Surfaces encased in or in contact with cast-in-place concrete including top flanges of beams supporting slabs.

.7 Surfaces and edges to be field welded for a distance of 50 mm (2") from joints.

.8 Faying surfaces of slip-critical connections.

.4 Apply one coat of contrasting colour shop paint to all protected zones indicated on structural drawings to clearly delineate their extent.

.5 Apply galvanizing in the shop to all structural steel located beyond the vapour barrier, including:

.1 Exposed exterior steel members.

.2 Exposed anchor rods.

.3 Other steel noted on drawings.

.6 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5ºC.

.7 Maintain dry condition and 5ºC minimum temperature until paint is thoroughly dry.

.8 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

3 EXECUTION

3.01 GENERAL

.1 Structural steel work: in accordance with CSA S16.

.2 Welding: in accordance with CSA W59.

3.02 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing works prior to start of fabrication. Report discrepancies, modify connection details if required and submit to Departmental Representative for review. Determine any potential interference with existing services and report problem areas to Departmental Representative for direction before commencing work.

.2 Take precautions to protect existing works from damage. Provide temporary shoring as required. Repair damage to adjacent materials caused by structural steel installation.

3.03 MODIFICATION / REMOVAL OF EXISTING STEEL WORK

.1 A set of Structural Drawings of the existing building may be viewed at the offices of the Departmental Representative.

.2 Dismantle and cut existing structural steel as required. Provide temporary shoring and bracing required for these operations. Retain a Professional Engineer to design the temporary shoring and to review this work on site.

.3 Clean existing structural steel, which is affected by the work and is to remain in place, down to bare metal, prior to its inspection so that its condition may be ascertained. Notify Departmental Representative when members are ready for inspection.

.4 Remove from site existing steel which is dismantled but not designated for re-use.

3.04 ERECTION

.1 Erect structural steel in accordance with CSA S16 and reviewed erection drawings.

.2 Do not field cut or alter any members without Departmental Representative approval.

.3 Make adequate provision for all loads acting on the structure during erection. Provide erection bracing to keep the structure stable, plumb and in true alignment during construction. Bracing members or connections shown on Structural Drawings are those required for the completed structure, and may not be sufficient for erection purposes. For load bearing masonry construction, maintain bracing until completion of masonry work and floor / roof decks which together provide permanent bracing. Do not remove erection bracings without written approval from the Engineer who designed it.

.4 Steel framing to be plumb at temperature of 20°C. If erection is carried out at temperatures greatly differing from 20°C, make adequate provisions; some members may need to be +erected out of plumb in order to become plumb when the temperature stabilizes at 20°C.

.5 Set column base plates to the elevation required for grouting using steel shims or leveling screws attached to sides of base plates. Do not fasten leveling nuts to anchor rods. Alternatively, for base plates equal or smaller than 350 mm x 350 mm (14” x 14”), leveling plates set with grout and level to within 1.5 mm (1/16") across the plate can be used. Do not erect columns upon plates exceeding this tolerance. Lift base plates for inspection when directed.

.6 Grout under column base plates and beam bearing plates as soon as steelwork is completed. Do not add load on steelwork until grouting is completed and grout strength has reached at least 20 MPa.

.7 Do not make permanent connections until structure has been properly aligned.

.8 Install bolts which are not pre-tensioned to be snug tight.

3.05 FIELD PAINTING

.1 Touch up damaged surfaces with the same paint as the shop coat.

.2 Repair any galvanized or zinc rich painted surfaces which have been damaged or field welded in accordance with SSPC Technology Guide No.14.

.3 Clean and prepare surfaces of bolts, which will receive a finished coat of paint in the same manner as the connected steelwork.

.4 Clean non galvanized steel surfaces which will be in contact with ground to SSPC SP-3 (Power Tool Cleaning) and apply two coats of epoxy paint to achieve dry film thickness between 0.20 mm and 0.35 mm (8 mils and 14 mils).

3.06 INSPECTION AND TESTING

.1 An Inspection and Testing Agency (certified to CSA W178.1 & 2) will be appointed to carry inspection and testing of all structural steel.

.2 Do not commence fabrication until details of inspection have been worked out with the Agency.

.3 Assist the Inspection and Testing Agency in its work. Notify as to the Work Schedule and provide safe access to the work area as required.

.4 The Inspection Agency will submit reports to Departmental Representative, Contractor and Municipal Authorities covering the Work inspected and provide details of errors or deficiencies observed.

.5 Work will be inspected in shop and when erected. Store fabricated members in shop so that they are accessible for inspection.

.6 Provide Inspection and Testing Agency with a copy of reviewed shop drawings.

.7 Welding inspection:

.1 Welding inspection will be conducted in shop and in field.

.2 The Inspector will check welders' CWB certification.

.3 The Inspector will review welding procedures for conformance with CWB requirements, manufacturers' requirements and standard practice.

.4 Arrange for the Inspector to be present during welding of 10% of moment connections and 10% of butt welds in direct tension.

.5 The inspector will visually check all welds at plate girders, all butt welds (including cranks and splices), all welds in moment connections, all welds at crane columns and crane girders, all welds of roof anchors to the base structure, 50% of welds in hanger connections and 20% of all other welds for:

.1 Size, length and profile

.2 Joint preparation, including cleaning and removal of any paint.

.3 Fit up and alignment.

.4 Penetration and fusion.

.5 Slag removal.

.6 Distortion.

.7 Porosity.

.8 Cracks.

.6 Non destructive testing will be conducted on the following connections:

.1 All shop and field welded splices.

.2 All welds on crane columns and girders.

.3 A representative 10% of all other welded connections.

.7 Test results will be evaluated in accordance with CSA W59.

.8 Field inspection:

.1 Arrange for the Inspector to start field inspection as soon as each section of the Work is completed, plumbed, bolts tightened and field welding finished.

.2 The Inspector will sample erection procedures for general conformity with Contract requirements.

.3 The Inspector will check general fit-up and tolerances and report any apparent distortions and misalignments.

.4 Minimum 10% of columns and 10% of beams will be checked by instruments for plumbness, alignment and elevation.

.5 Field inspection will include:

.1 Checking individual frame members for twisting, sweep and local damage.

.2 Checking levelness of leveling plates.

.3 Inspection of grouting under base plates and bearing plates.

.4 Checking column bearings on cast in plates.

.5 Checking bearings on steel and masonry.

.6 Inspection of sliding bearings.

.7 Inspection of bolting, shear studs and post installed anchors as described below.

.8 Checking installation of permanent bracings and nominal tension in finished building (where specified).

.9 Checking truss permanent bridging and end connections.

.10 Checking that column connections are adjusted to keep the columns plumb after supported structure has deflected due to dead loads applied to floor and roof deck.

.11 Checking that all adjustable connections at wall supporting members have been finalized after concrete is poured.

.12 Inspection of approved field cutting and reinforcing around openings.

.13 Inspection of field painting.

.14 Inspection of field touch-up.

.6 Bolting inspection:

.1 The Inspector will visually check all bolts in bearing connections. Where erection drawings indicate bolts with threads excluded from the shear plane, he will remove nuts from 1% of all bearing bolts and check that thread is excluded from the shear planes.

.2 The Inspector will check that surfaces in slip- critical connections are free from paint and other deleterious substances

.7 Post installed anchor inspection:

.1 The Inspector will sample check drilled concrete and masonry anchors.

.2 The Inspector will provide full time inspection during installation of post installed adhesive anchors subject to sustained tension loads.

.3 The Inspector will randomly select and pull test 5% of all types and sizes of post installed anchors installed on a weekly basis, but not less than one anchor of each type, size and orientation. Pull test to twice the allowable tensile load, or 1.5 times the factored resistance of the anchor given by the manufacturer. Chose anchor locations where proximity to concrete edge does not affect anchor capacity, or use reduced anchor loads per manufacturer’s recommendation. Submit reports to Departmental Representative within one week of testing. Reports to indicate each anchor location, test load and mode of failure, if applicable. Notify Departmental Representative immediately if any anchor fails the pull test.

END OF SECTION

1 GENERAL

1.01 DESCRIPTION

.1 Fabrication, supply and installation of miscellaneous metal fabrications complete with fasteners, anchorage and accessories.

.2 Coordinate with Section 05 12 23 – Structural Steel for Buildings, to avoid duplication or omission. In the case of conflict with notes on the drawings or other specification sections the more stringent will apply.

.3 Include installation of scheduled metal items supplied by Others. Coordinate with said supplier sections.

1.02 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 45 00 – Quality Control.

.3 Section 03 30 00 – Cast-in-Place Concrete.

.4 Section 05 12 23 – Structural Steel for Buildings.

.5 Section 09 90 00 – High Performance Coatings.

.6 Section 10 14 00 – Signage.

1.03 REFERENCES

.1 All codes and documents referred to in this Section shall be the current adopted edition.

.2 American Society for Testing and Materials International, (ASTM)

.1 ASTM A53/A53M-05, Specification for Pipe: Steel, Black, Hot-Dipped, Zinc-Coated, Welded and Seamless.

.2 ASTM A307-076, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coating.

.4 Canadian Standards Association (CSA International)

.1 CAN/CSA-G40.20/G40.21-04, 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, Design of Steel Structures.

.4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.

.5 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.6 CAN/CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures and W59 Welded Steel Construction (Metal Arc Welding).

.7 CAN/CSA S136, Cold Formed Steel Structural Members.

.5 National Building Code of Canada (NBCC), 2015.

.6 CISC Code of Standard Practice.

1.04 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheets for manufactured items.

.3 Shop Drawings

.1 Submit shop drawings prepared under the supervision of a Professional Engineer registered in the Province of British Columbia. Drawings of components designed by the fabricator shall be signed and sealed by the Registered Professional Engineer.

.2 Shop drawings shall complete details necessary for fabrication and erection of the component parts of the structure, including location, type, size and extent of all welds. Splices not shown on the shop drawings will not be accepted.

.3 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

.4 Where metal fabrication items interface with equipment and other building elements, this section shall be responsible for obtaining all measurements of said items prior to preparation of shop drawings.

.5 Review of shop drawings constitutes review of general methods only and will not include approval of dimensions, figures or quantities. The Supplier is responsible for structural design, correct fabrication and proper fitting of various items.

.6 Submit samples of each finish of metal for Departmental Representative’s approval, as requested.

1.05 LETTERS OF ASSURANCE

.1 The Engineer responsible for sealing the engineered shop drawings shall submit to the Departmental Representative, Schedule B-1 Assurance of Professional Design and Commitment for Field Review and Schedule B-2 Summary of Design and Field Review Requirements with the shop drawings.

.2 Engineer shall provide field review of the installation and submit to the Departmental Representative Schedule C-B Assurance of Professional Field Review and Compliance upon completion of the work.

1.06 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 All Steel Fabricators must have full approval of the Canadian Welding Bureau under CSA W47.1.

1.07 STORAGE AND HANDLING

.1 This section shall be responsible for the protection of all metal work during fabrication, shipping, storage and construction. All small bends and damage shall be reported to the Departmental Representative for instructions. Metal work, which is bent, broken or otherwise damaged, shall be repaired or replaced at no cost to the Departmental Representative.

.2 This section shall be responsible for proper scheduling of delivery and erection for the metal fabrications, all in accordance with the construction schedule.

1.08 COORDINATION WITH OTHER SECTIONS

.1 Supply all necessary instructions and drawings to other trades for setting bearing plates, anchor bolts, and other members that are built in with the work of other sections. Supply the necessary material in accordance to the construction schedule.

1.09 EXAMINATION

.1 All dimensions shall be taken from the drawings and verified against site conditions. Be responsible for the correctness of such measurements and report to the Departmental Representative in writing all dimensional discrepancies prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

1.10 INSPECTION AND TESTING

.1 Allow free access to all parts of the works for the purposes of inspection at all times.

.2 Prior to commencement of work provide a schedule of shop fabrication.

.3 The Departmental Representative may reject, at any time during the progress of the work, a piece of material for any member which he may find defective or not in accordance with the detailed drawings. This material may be rejected notwithstanding any previous acceptance, and components so rejected shall be replaced at no expense to the Owner. In case of dispute, the decision of the Departmental Representative shall be final.

2 PRODUCTS

2.01 MATERIALS

.1 All steel shall be new unless otherwise indicated and be of sizes and shapes listed in the current CISC handbook and as indicated on the drawings.

.2 Rolled shapes and welded wide flange sections shall be to CAN 3-G40.21-350W.

.3 Plates and flat bars shall be to CAN 3-G40.21-300W.

.4 Hollow structural sections shall be to CAN 3-G40.21-350W Class C.

.5 High strength bolts shall be to ASTM A325, Type 1; nuts to ASTM A563, HEX.

.6 Misc. bolts and nuts to ASTM F1554, Grade 36.

.7 Steel pipe: to ASTM A53/A53M, Grade B, standard weight, (Schedule 40) and extra strong (Schedule 80).

.8 Welding materials: to CSA W59.

.9 Welding electrodes: to CSA W48 Series.

.10 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.02 FABRICATION

.1 Fabricate work in accordance with reviewed shop drawings, square, true, straight and accurate to required size, with joints closely fitted and properly secured and in accordance with CSA S16-09.

.2 Where possible, fit and shop assemble work, ready for erection.

.3 All Welding shall be to CSA W59, by welders qualified in accordance with CSA W47.1.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush. Fabricate all miscellaneous metalwork shown and detailed in the drawings and listed in this section in the quantities required.

.5 Assemble built-up work in the shop and match-mark for correct field erection.

.6 All copes, mitres and butt cuts in surfaces exposed to view shall be made with uniform gaps of 3.0 mm if detailed to be open joints or in uniform contact if detailed without gaps.

.7 Weld in such a manner as to avoid distortion, discolouration or damage to the members.

.8 Weld exposed exterior work continuously to provide a proper weathering seal to prevent leakage and other damage.

.9 Weld interior work continuously along the entire line of contact except where spot welding is indicated or permitted.

.10 Grind welds smooth where exposed to view.

.11 All hollow structural sections shall be closed airtight with end plates sealed with welds.

.12 All plates and shapes shall be inspected visually for laminations. Repair plates or shapes which contain laminations in a manner to be reviewed by the Departmental Representative.

.13 Provide all required holes in metalwork for attaching other materials.

.14 Drill for countersunk screws if exposed to view unless otherwise shown or accepted by the Departmental Representative.

.15 Locate holes in structural members for connections or for other purposes so as not to cause appreciable reduction in the strength of members.

.16 Reinforce all work to suit the purpose for which it is intended and to withstand design loads.

.17 Fabricate work square, true, straight and accurate to detail with sharply, defined profiles.

.18 Fabricate curved work to smooth, uniform constant radii as detailed.

.19 Joints in materials shall be cut to form fine hairline joints flush with adjacent surfaces.

.20 Provide suitable temporary bracing as required to maintain alignment during shipment and erection.

2.03 METAL FINISHES

.1 Refer to Section 09 96 00 - High Performance Coatings.

2.04 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 Preservative-treated wood.

2.05 SHOP PREPARATION FOR PAINTING

.1 Clean metal of all loose mill scale, rust, oil, dirt and all other foreign matter.

.2 All steel shall be primed except for steel to be encased in concrete, steel to be fireproofed, steel which will receive shear studs, and faying surfaces of friction connections.

.3 Clean metal to be painted in accordance with SSPC SP.I Solvent Cleaning followed with SSPC SP.6 Commercial Blast Cleaning.

.4 Remove or repair sharp edges, burrs, weld spatter and other defects to steel members prior to application of primers.

.5 After erection and after connections are completed, provide a field touch up coat of primer to all surfaces that had no shop coat, or have been chipped or scraped.

2.06 SHOP PAINTING

.1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items. For items to be finish painted apply primers in accordance with Section 09 96 00. Apply primer as specified under Section 09 96 00 in accordance with manufacturer's directions. Ensure that primer is applied within 8 hours of completion of surface preparations.

.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.

.4 All exterior metal in contact with masonry or concrete shall be back-primed before installation.

.5 If the correct primer is not applied by this section of the Work, this section is responsible for removal of the incorrect primer, re-conditioning the surface and applying the correct primer as specified, including removal and re-installation of the affected work as required.

.6 Primer applied to surfaces not properly prepared in accordance with specified SSPC preparations will be rejected by the Departmental Representative and shall be removed, brought up to the specified requirements and re-installed by the Contractor at no additional cost to the Departmental Representative.

3 EXECUTION

3.01 ERECTION

.1 Supervise the setting of bases, anchor bolts, and other metal to concrete or masonry connections. Cutting of base plates to accommodate anchor bolts shall be cause for rejection of base plates.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative 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, or weld.

.7 Hand items over for casting into concrete to appropriate trades together with setting templates.

.8 Install all temporary bracing which is required to stabilize the work against wind, earthquake and construction loads. Keep structure true and plumb until completion of the building.

.9 As erection progresses, the work shall be securely bolted up to take care of all dead loads, wind, earthquake, and erection stresses. Any failure to make proper and adequate provisions for stresses during erection shall be solely the responsibility of this section.

.10 The Metal Fabrications Erector shall be responsible for the design of all hooks, erection connections and handling gear.

.11 Whenever piles of materials, erection equipment, or other loads are carried during erection, make proper provision to safely accommodate stresses resulting from same.

.12 All metal fabrication shall be assembled and erected in accordance with the reviewed shop and erection drawings and specified reference standards.

.13 Metal fabrication work shall be carefully located at the proper elevation and rigidly secured in place, using steel shims. All spaces under the steel shall then be filled with non-shrink, pre-mix, non-metallic grout, pre-approved by the Departmental Representative.

.14 Plumb, level and align individual members of metal work as specified in CSA S16-09.

.15 All exposed metal work shall be finished and assembled to provide the best possible visual appearance to the satisfaction of the Departmental Representative.

.16 Obtain written permission from Departmental Representative prior to field cutting or altering of structural members.

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

.18 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.02 WELDING

.1 All welding shall be done by the shielded metal-arc method in accordance with the requirements CSA W59. The welding operators shall have passed within the preceding six (6) months, the qualification test as set forth in CSA W47.1.

.2 Submit welding procedures prepared and sealed by a Professional Engineer registered in the Province of British Columbia familiar with the discipline to the Departmental Representative for his examination and comments.

.3 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, each layer shall be cleaned before the next layer is deposited. Care shall be taken to minimize stresses due to heat expansion, contraction and distortion by using proper sequence in welding and by approved methods.

.4 Welding consumables for all processes shall be fully approved by the Canadian Welding Bureau and certified by the manufacturers as complying with the requirements of this specification. Such certificates shall be no more than two years old.

.5 Electrode strengths to be equal to E70xx or better.

.6 All exposed welding shall be finished to provide the best possible visual appearance to the satisfaction of the Departmental Representative.

3.03 SCHEDULE OF ARCHITECTURAL METAL FABRICATIONS

.1 The following schedule of Architectural Metal Fabrications covers the work to be done in general. It is not intended as a complete list. Include items shown on the drawings or obviously required to make a complete job. Coordinate work with that of other sections to ensure that all items are provided.

.2 Steel channel protecting column electrical receptacle.

.1 Fabricate and install as detailed.

.3 Supports for External Signage

.1 Coordinate design, fabrication and installation of all brackets and support assemblies for exterior signage per Section 10 14 00

.4 Miscellaneous Metal Items.

.1 Provide the following items, including but not limited to the following:

.1 Anchorage sleeves.

.2 Anchorage plates, bolts.

.3 Covers and Frames.

.4 Embedded steel plates, angles and channels in concrete.

.5 Non-structural steel angles, plates, brackets, closures.

.2 Fabricate and install as detailed all misc. frames, brackets, and supports.

.3 Galvanize at exterior locations.

.4 Coordinate dimensions and profiles with interfacing sections.

3.04 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

1 GENERAL

1.01 WORK INCLUDED

.1 Sheet-applied self-adhesive combination air/vapour barrier sheathing and flashing/transition membrane at rain screen cavity assemblies.

.2 Sheet-applied self-adhesive foil-faced membrane flashing required to provide continuity detailing at interruptions in wall envelope such as fenestration.

.3 Liquid-applied flashing membrane as a wall penetration and detailing sealant.

1.02 RELATED WORK

.1 Section 07 42 43 - Composite Wall Panel System.

.2 Section 07 42 93 - Soffit Panel System.

.3 Section 07 52 00 - Modified Bituminous Membrane Roofing.

.4 Section 07 62 00 - Sheet Metal Flashing and Trim.

1.03 QUALITY ASSURANCE

.1 Qualifications: Work of this section shall be executed by competent installers with minimum 5 years experience in application of products, systems and assemblies specified and with approval and training of product manufacturer.

.2 Conduct quality control in accordance with Section 01 45 00.

.3 All sealants, primers, mastics and adhesives associated with the sheathing membrane shall be products of said sheathing membrane manufacturer.

1.04 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product data sheets:

.1 Submit manufacturer’s product data sheets for products proposed for use in the work of this section.

.3 Samples:

.1 At the Departmental Representative’s request, samples of materials shall be submitted for approval, prior to commencing work concerned.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

.1 Deliver and store all materials in their original packaging in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Make all necessary arrangements with regard to delivery and storage on the site with the Departmental Representative and schedule deliveries accordingly. In general, deliver material as required for installation and keep site storage to a minimum.

.3 Provide all plant and equipment necessary for off-loading of materials to complete the work of this section.

.4 Protect materials from damage, weather and store in a dry place.

.5 Handle materials and equipment in strict accordance with manufacturer's recommendations. Damaged or deteriorated materials shall be removed from premises.

1.06 JOB CONDITIONS

.1 Conform to membrane manufacturer's requirements for minimum application temperatures and humidity. Check surfaces and areas specified and shown to receive membrane.

.2 Report any unsatisfactory conditions and/or surfaces to the Departmental Representative in writing. Starting work shall imply acceptance of surfaces and conditions.

.3 Take all necessary measurements and levels at the building. The work shall be laid out to accurately fit the conditions at the building and with adjacent work.

.4 Notify the Departmental Representative of any variations beyond the accepted tolerances in the substrate or in the adjacent work, including membrane roofing (Section 07 52 00).

.5 Provide forced air circulation during curing period for enclosed applications.

.6 Low temperature application:

.1 Perform adhesion test for membrane when ambient temperature is below -5°C. Sheathing membrane manufacturer must produce both “summer” and “winter” (low temp.) grades.

.2 Proceed with work when temperature is (or predicted) to fall below -5°C ambient temperature only with the mutual documented agreement of inspection and testing company, manufacturer and applicator.

.7 Do not perform installation during rainy or inclement weather or on wet or frost covered surfaces.

.8 Provide temporary protection of the applied membrane to prevent mechanical damage or damage from spillage of oil or solvents.

1.07 PERFORMANCE REQUIREMENTS

.1 Sheathing membrane system shall perform as a continuous air barrier and liquid water drainage plane flashed to discharge incidental condensation or water penetration to the exterior of the building envelope.

.2 The membrane flashing/universal transition membrane shall perform as flashing by providing continuity at interruptions in sheathing systems caused by openings in building structure and interfacing with other elements and systems. The membrane system is also employed as a transition membrane between envelope components and other membranes and waterproofing systems. Ensure compatibility between systems.

.3 All self-adhesive membrane systems shall accommodate substrate movement, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding the specified limits and requirements, or interruption of the drainage plane.

.4 The sheathing membrane shall comply with the following criteria and values:

.1 Air permeance: Maximum 0.0005 L/s m2 at 75 Pa (0.00001 cfm/ft2 at 1.57 psf) to ASTM E2178-03

.2 Must pass ASTM 2357 air leakage resistance criteria.

.3 Water vapour transmission: <0.90 ng/pa•s•m2 (<0.016 perm) to ASTM E96 (Procedure ‘B’).

.4 Peel resistance: 2800 N/m (16 lb/in) to ASTM D903.

.5 Low temperature flexibility: -35°C (-31°F) to ASTM D5147.

.5 Air barrier systems shall be joined in an airtight and flexible manner to air barrier material of adjacent building envelope systems, employing transition membrane, allowing for relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between the following unless otherwise applicable:

.1 Foundation and walls.

.2 Walls and openings (windows, doors, louvers, and other wall penetrations).

.3 Different wall systems.

.4 Wall and roof.

.5 Wall and roof over non-climate controlled space.

.6 Walls, floor and roof across construction, control, and expansion joints.

.7 Walls, floors and roof to utility, pipe and duct penetrations.

.6 Provide temporary protection of the applied membrane to prevent mechanical damage or damage from spillage of oil or solvents.

2 PRODUCTS

2.01 SELF-ADHESIVE SHEATHING AND FLASHING/TRANSITION MEMBRANE

.1 Description: Self-adhering modified bituminous membrane system consisting of SBS modified bitumen and a tri-laminated woven polyethylene facer. The underface shall be covered with a silicone release paper or film. Membrane shall be available in “summer” and “winter” grades and shall comply with the following physical properties:

.1 Thickness: 1.0 mm (40 mils) minimum.

.2 Application temperature: as per manufacturer’s printed installation instructions.

.3 Min. tensile strength to ASTM D5147: 11.3/15.4 kN/m (64/88 lb/in).

.4 Min. tensile strength to ASTM D412: 11.2/31.1 MPa.

.5 Static puncture: 400 N (90 lb) to ASTM D5602; 747 N (168 lb) to ASTM E154.

.2 Primer: as manufactured by membrane manufacturer specifically for membrane.

.3 Termination mastic: as recommended by membrane manufacturer.

.4 Ensure that self-adhering membrane is compatible with and will adhere permanently to all interfacing substrate materials and systems, including foil-faced membrane (2.2) and Membrane Roofing (Section 07 52 00).

.5 If required by the Departmental Representative, demonstrate accelerated long term adhesion to all substrate appropriate to this Project. Refer to Section 01 45 00.

.6 Acceptable Products:

.1 Soprema ‘Sopraseal Stick 1100T Summer Grade and Winter Grade with ‘Elastocol Stick’ primer.

2.02 SELF-ADHESIVE FOIL-FACED MEMBRANE FLASHING

.1 Multi-purpose, self-adhering detailing membrane for use at door/window openings, vents and other interruptions in the wall membrane system.

.2 Membrane shall be composed of a proprietary base fabric/film laminated to an aluminum foil and available in various roll widths.

.3 Acceptable products:

.1 ‘Protector Seal 45” by Protecto Wrap.

.2 “Sopra Solin HD” by Soprema.

.3 Other products with similar characteristics and proven long term adhesion to moist substrates will not be excluded.

2.03 LIQUID-APPLIED FLASHING MEMBRANE

.1 Liquid-applied flashing membrane for use as a sealant at penetrations to the wall sheathing membrane,

as a detailing sealant and as noted and detailed.

.2 Material shall be a gun grade waterproofing, adhesive and detailing compound composed of 99% solids, roller/trowel/brush applied, single component, high performance, elastomeric, silyl-terminated polyester coating/sealant exhibiting the combined benefits of silicone and urethane. Product shall meet all current VOC requirements and contain no solvents or isocyanates.

.3 Liquid-applied flashing system shall comply with the following properties when cured:

.1	Hardness, Shore A	40—45
.2	Tensile Strength	180 Psi
.3	Elongation at Break	400%
.4	Peel Strength	25 pli
.5	Accelerated Weathering	Must Pass
.6	Water Vapour Transmission	14 perms @ 12 mils
.7	Surface Burning ASTM E84	Flame Spread: 0
		Smoke Developed: 15
		NFPA and ICC Class A Building Material

.4 Uncured properties:

.1	Tack Free Time	<30 minutes
.2	Cure Rate	3/16 inch/24 hours
.3	Volatile Organic Content	1.5% by wt.
		27 g/Lt .2 lbs/gal
.4	Water Vapour Transmission	6.34 grains/hour/Ft^2

.5 An example of the accepted product is “R-Guard Fast Flash” as manufactured by Prosoco. Other products having the same demonstratable characteristics will not be excluded.

3 EXECUTION

3.01 PREPARATION

.1 Preparation of all surfaces to receive self-adhering membranes including substrate, joints, cracks, coves etc. shall be carried out in accordance with manufacturer's written directions.

.2 Ensure that all substrate surfaces are smooth, dry and firm. Remove any frost, ice, loose particles, ridges, laitance, cracks, grease, asphalt, oil and other foreign matter which could prevent adhesion of the membrane to the substrate.

.3 Do not install membranes until other work which penetrates membrane has been completed.

.4 Seal around membrane penetrating elements in accordance with manufacturer’s printed installation instructions.

3.02 PRIMING

.1 All surfaces to receive self-adhering membrane shall be primed at the rate recommended by the manufacturer. Primer shall be uniformly applied.

.2 Open time of 30 minutes shall be allowed before installation of self-adhering membrane.

3.03 SHEATHING MEMBRANE INSTALLATION

.1 Install membrane in accordance with manufacturer’s printed instructions over flashings and corner

reinforcement.

.2 Begin installation at the base of the wall placing top edge of membrane immediately below materials protruding from substrate.

.3 When properly positioned, place against surface by pressing firmly into place. Roll membrane with extension-handled countertop roller immediately after placement.

.4 Overlap horizontally-adjacent pieces 50 mm and roll seams.

.5 Bottom edge shall be slit to fit around penetrations. Membrane shall overlap the membrane sheet below by 50 mm. Roll firmly into place.

.6 Seal around materials penetrating membrane with termination mastic. At end of each working day, seal top edge of membrane to substrate with termination mastic.

.7 Do not allow the rubberized asphalt surface of membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.

.8 Do not expose membrane to sunlight for more than thirty days prior to enclosure.

.9 Apply a bead or towel coat of mastic along membrane edges, seams, cuts, and penetrations.

.10 Roll membrane with 75 mm wide hand roller.

.11 Tie into adjacent wall systems and roof systems for continuous air barrier at building envelope.

.12 Flashing and Corner Reinforcing:

.1 Where applicable, bring flashing a minimum of 150 mm onto horizontal surfaces and a minimum of 200 mm up walls from horizontal elevation shown.

.2 Stagger flashing and membrane seams.

.3 Install flashing to protrusions, expansion joints, control joints and the like. Bring flashing a minimum of 150 mm onto the membrane.

.4 Wrap air barrier membrane into jambs and sills at openings. Terminate membrane at points that will prevent visibility from interior.

.13 Inspection: Inspect membrane for punctures, misaligned seams and fishmouths, apply additional layer of membrane over affected area, extending minimum of 150 mm beyond damaged area in all directions.

.14 Coordinate proper construction of the roof/wall intersection to maintain the continuity of the air barrier system from the wall to the roofing membrane system.

3.04 TRANSITION/FLASHING AND FOIL-FACED MEMBRANE INSTALLATION

.1 Apply self-adhering “detailing” membranes to surfaces as indicated on drawings and as specified.

.2 Application of membrane, including temperature limitations, curing requirements and all other application procedures shall be carried out in accordance with membrane manufacturer's written directions.

.3 Coordinate proper construction of roof/wall junctions between Section 07 27 13 and interfacing materials and systems so as to maintain continuity of the air barrier from wall to roof.

.4 Cut and seal membrane around protrusions to form tight air seal.

.5 Apply trowelled bead of mastic to all terminations at end of each day's work.

.6 Inspect membrane thoroughly before being covered and make any corrections immediately. Misaligned or inadequately capped seams, punctures or other damage shall be repaired by patching and sealing with membrane manufacturer's directions.

.7 Adhere transition membrane to sheathing membrane at wall openings and flash into pockets, taking

extra care to ensure continuity of the air/vapour barrier.

.8 Membrane shall be continuously supported.

.9 Extend all membrane patches a minimum 150 mm from repair location or penetration. Seal all around patch with mastic.

.10 Seal all side laps without factory bitumen edge and all top laps with mastic.

.11 Fill all joints or gaps wider than 6 mm with foam backer rod and apply 300 mm piece of membrane over joints prior to application of the field membrane.

.12 Coordinate installation of membrane with other interfacing Sections to minimize exposure of membrane.

.13 When self-adhering membrane interfaces with incompatible membranes, ensure that bond is made only to bridge membranes.

3.05 LIQUID-APPLIED FLASHING MEMBRANE APPLICATION

.1 At penetrations to all self-adhered wall sheathing and transition membranes: Apply liquid- applied flashing system onto foil-faced self-adhered membrane in strict accordance with manufacturer's printed instructions by brush, roller or towel between ambient temperatures of +1°C and 30°C.

3.06 ADJUST AND CLEAN

.1 Repair, remove and clean all smears on exposed finished surfaces or surfaces to be subsequently finished. Clean off immediately as directed by and to the satisfaction of the Departmental Representative.

.2 Protect all adjacent surfaces from damage due to self-adhered membrane operations.

.3 As work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from this work.

END OF SECTION

1 GENERAL

1.01 WORK INCLUDED

.1 Provide all material, labour, equipment and services required for the engineered design, fabrication and installation of factory-finished fiber cement board panel rainscreen wall system.

.2 Include panels and all sub-framing, girts, trim, fixings, anchorage, sealants and tie-in to interfacing building components and weather barriers.

1.02 RELATED SECTIONS

.1 Section 05 41 00 - Structural Metal Stud Framing.

.2 Section 07 27 13 - Self-Adhesive Membrane.

.3 Section 07 62 00 - Sheet Metal Flashings.

.4 Section 07 90 00 - Sealants.

1.03 REFERENCES (LATEST EDITIONS OF FOLLOWING)

.1 ASTM C-920, Standard Specification for Elastomeric Joint Sealants.

.2 ASTM C-1185, Standard Test Methods for Sampling and Testing Non-Asbestos Fibre- Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.

.3 ASTM C-1186, Standard Specification for Flat Non-Asbestos Fibre Cement Sheets.

.4 ASTM E-72, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

.5 ASTM E-84, Standard Test Method for Surface Burning Characteristics of Building Materials.

.6 ASTM E-96, Standard Test Methods for Water Vapour Transmission of Materials.

.7 ASTM E-136, Standard Test Method for Behaviour of Materials in a Vertical Tube Furnace at 750°C.

.8 ASTM E228, Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer.

.9 ASTM G26, Standard Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.

.10 CAN/CSA S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members.

.11 CSSBI 50M-87, Lightweight Steel Framing Manual.

.12 CSSBI 52M-91, Lightweight Steel Framing Binder.

.13 National Building Code of Canada (NBCC), 2015.

.14 German Construction Systems Inc- GCS Super Panel Drawings, Details and Guidelines

1.04 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittals.

.2 Product Data: Submit product data sheets.

.3 Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including edge conditions, panel joints, fixture location, anchorage, accessories, finish colours, patterns and textures. Shop drawings shall also be approved by panel material manufacturer in order to maintain warranty. Shop drawings shall be sealed by a professional engineer (specialty engineer) registered in British Columbia.

.4 Engage a professional engineer licensed to practice in the Province of British Columbia who shall:

.1 Provide Schedule S-B and carry out enough timely and regular inspections to:

.1 Review fabrication and ensuring specified products are used.

.2 Ensure that manufacturer's design and installation specification as tested has been replicated.

.3 Ensure and certify installation meets the requirements of NBC (2015) for design, structural support, construction and installation.

.2 Issue a Letter of Certification (Schedule S-C) stating that the components have been fabricated and installed in accordance with design and Code requirements.

.3 The cost of the above engineering, inspections and issuing required Schedules S-B and S-C shall be included as part of the cost for work under this Section.

.5 Samples: Submit 200 x 250 mm colour samples for selection by Departmental Representative.

.6 Quality Assurance Submittals: Submit the following:

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

.2 Qualification Certificates: Submit certificate indicating compliance with qualification requirements in Quality Assurance article.

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

.7 Manufacturer's installation instruction manual.

.8 Closeout Submittals: Submit the following:

.1 Closeout Submittals (Maintenance Data and Operation Data). Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

.2 Warranty: Warranty documents specified herein.

1.05 QUALITY ASSURANCE

.1 Installer shall have a minimum of five (5) years of proven experience in the installation of the specified products on projects of a similar size and scope.

.2 Fabricator/Installer Qualifications: Installer shall be approved by the panel material manufacturer in writing.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. .

.2 Storage and Protection: Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer.

.3 Remove damaged materials from site.

1.07 PROJECT CONDITIONS AND COORDINATION

.1 Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

.2 Coordinate work of this section with that of all interfacing component sections.

1.08 SYSTEM DESIGN REQUIREMENTS

.1 Components: Design and size to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of panel, conforming to NBCC, 2015 for project location climatic conditions.

.2 Allowable framing deflection: L/175.

.3 Thermal Movement: Design system to accommodate vertical and horizontal thermal movement of components without causing buckling, failure of joint seals, undue stress on fasteners, and oil canning when subject to seasonal temperature cycling.

.4 Drainage: Design for positive drainage of water leakage and condensation to exterior of wall panel system.

.5 Tolerance of Substructure: Design system to accommodate up to 6 mm in 3050 mm variation out of plane. Accommodate tolerances of building structural framing.

.6 Design entire composite wall panel system to perform as an effective pressure equalized rainscreen conforming to the principles outlined in AAMA 508-07, with a minimum 20mm airspace throughout.

1.09 WARRANTY

.1 Provide the following warranties:

.1 Panel manufacturer's transferable ten (10) year warranty covering defects in materials. (Warranty only available when material installed by certified installation contractor and Shop drawings approved by manufacturer).

.2 Panel System Fabricator: 2 year fabrication Warranty for conformance to design and performance and requirements.

.3 Installer: 2 year Workmanship Warranty.

2 PRODUCTS

2.01 PANEL MATERIALS

.1 Pre-finished, smooth surface, fiber cement board composed of cement, silicone-calcium strengthened with a combination of cellulose fibers and resins without asbestos, fiberglass or formaldehyde, complying with the following:

.1 Panel size: 1220 x 2500 (or 3040)mm, or less, shaped to suit architectural design. 8mm thickness.

.2 Weight: 13 kg/sq.m.

.3 Fastening: stainless steel or galvanized, as directed by Departmental Representative to meet wall assembly min. R-values, size and type as recommended by the panel Manufacturer for applicable substrate.

.4 Factory applied surface treatment to provide complete water repellent properties on all six sides. Coatings shall not contain any solvents.

.5 Tested to UBC Class 1, NFPA Class A, and CAN/ULC S134.

.6 Colour and type to match existing panels, as selected by Departmental Representative from manufacturer's colour samples.

.7 Homogeneous smooth semi-matte surface finish.

2.02 SUBGIRTS AND FRAMING

.1 Sizes, gauges and spacing of all sub-framing and wall attachment components shall be in strict accordance with reviewed shop/erection drawings as sealed by the Specialty Engineer and approved by panel manufacturer.

.1 Replace existing damaged framing members onsite as required.

.2 Subgirts shall be corrosion resistant metal either hat-shaped, 'C' or 'Z' sections of sufficient width to allow for free air movement in the rain screen cavity. Subgirts shall not penetrate the exterior Mineral Wool insulation.

.3 All horizontal subgirts and framing shall be perforated at regular intervals to permit drainage of cavity where said members extend un-impeded through cavity.

2.03 FASTENING AND ANCHORAGE

.1 Provide all required clips, fixings, panel fasteners and framing anchors. Exposed fasteners for panels shall be panel manufacturer's standard, and to match existing fasteners. Framing anchors shall be non-thermal bridging of type and size appropriate to substrate as determined by Specialty Engineer.

.2 Sizes, type and spacing of fasteners and attachment devices associated with the composite wall panel assembly shall be in strict accordance with reviewed shop/erection drawings as sealed by the Specialty Engineer, and of material which will minimize thermal bridging.

.3 All fasteners shall be non-corrosive, non-galvanic, and be compatible with panel materials, finishes and substrate. Use EPDM rubber spacers, shims or washers between panels and sub-framing connections, per installation standard and to match existing.

.4 Provide aluminum insect screen, or compatible punched/vented metal channel, for venting bottom of rainscreen cavity, as detailed and to match existing.

2.04 SEALANTS

.1 The supply and application of all required sealants and caulking associated with the composite panel system, including sealing at joints with interfacing materials and systems, shall be by panel fabricator/installer.

.2 Use only compatible sealant products approved by panel manufacturer.

2.05 ACCEPTED PRODUCTS

.1 To match existing:

.1 *Super Panel* as distributed by German Construction Systems Inc, Vancouver, BC tel: (604) 983-2220

.1 Colour: to match existing.

3 EXECUTION

3.01 EXAMINATION

.1 Examine substrate surfaces to receive composite wall panel system and associated work, and the condition in which work will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer, manufacturer and Departmental Representative.

.2 Report any discovered discrepancies to the Departmental Representative so that instructions may be given for the necessary remedial work.

3.02 PREPARATION

.1 Prepare substrate surfaces to insure proper and adequate installation in accordance with the contract documents, reviewed shop drawings, and manufacturer's written requirements and instructions.

.2 Field measurement and verification of dimensions are required.

.3 Protect adjacent elements and surfaces from damages.

.4 Replace existing damaged framing members onsite as required.

.5 Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C754, panel manufacturer's written instructions and reviewed/sealed shop and erection drawings.

3.03 ERECTION GENERAL

.1 Install composite wall panel system in strict accordance with panel manufacturer's written instructions and

reviewed/sealed shop and erection drawings to produce a complete weatherproof pressure equalized rainscreen assembly.

.2 Erect panels plumb, true and level and in correct alignment with established lines and elevation shown on reviewed shop and erection drawings. Panel widths to match existing panels.

.3 Install all girts, clips, anchors, and flashing securely to surrounding construction spaced to afford maximum rigidity and minimize thermal bridging.

.4 Provide all openings for mechanical and electrical services, piping, louvers, etc., which penetrate panels. Provide watertight flanges, flashings, reinforcing and sealant around all penetrations exposed to the weather and or as shown on the drawings.

.5 Joints shall not be less than their dimensioned width (min. 8 mm) or more than five percent (5) greater than their dimensioned width at any location along their full length and shall not be wavy, out of line or of different width panel to panel. Panel joint widths to match existing.

.6 Installed panels shall not deviate from overall plane or alignment more than 1.5 mm in 900 mm.

.7 Keep a minimum distance to corners and edges as recommended by the panel manufacturer.

.8 Finished installation shall be properly secured, free of rattles, distortions, damaged, or chipped components.

3.04 FIELD QUALITY CONTROL

.1 The manufacturer’s or suppliers professional specialty engineer shall be responsible for periodic inspections during construction as required. Such inspections and associated costs shall be included in the Contract.

.2 Letters of Assurance at completion of work: the Specialty Engineer who seals the shop drawings submission shall submit Schedule S-C. Written inspection reports of field review shall be submitted to the Departmental Representative by the Specialty Engineer.

3.05 CLEAN UP

.1 Remove manufacturer’s protective film at appropriate time in advance of the date of substantial performance of the Project. Review concurrently to ensure there is no damage or marring to the wall panels. Replace damaged or marred panels accordingly to the approval of the Departmental Representative.

.2 Clean panels to remove surface dust, dirt, stains and marks on the panels caused by ambient environmental weather conditions and construction activities. Use cleaners approved by the manufacturer’s of surfaces to be cleaned. Protect panels from damage by other trades.

.3 At completion of the work of this Section, remove any excess materials, debris and equipment, pertaining to the work of this Section, from the site.

END OF SECTION

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1 GENERAL

1.01 WORK INCLUDED

.1 Provide all materials, labour, equipment and services, necessary for the detailed engineered design, erection drawings, shop drawings, fabrication and erection of the complete factory finished painted and wood grain pattern formed aluminum exterior soffit panel systems.

.2 Include all concealed fastening, sealants, required sub-framing and matching flashing and accessories.

.3 Moulded Aluminum soffit venting system.

1.02 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 19 – Waste Management and Disposal.

.3 Section 07 42 43 – Composite Wall Panel System.

.4 Section 07 90 00 – Sealants.

1.03 REFERENCES

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

.2 CGSB 93-GP-5M, “Installation of Metal Residential Siding, Soffits and Fascia”.

.3 ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate.

.4 ASTM D958 – Practice for Determining Temperatures of Standard ASTM Molds for Test Specimens of Plastics.

.5 AAMA 2605-05 – Voluntary Specification, Performance requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

.6 AAMA 2604 – Voluntary Specification, Performance requirements and Test Procedures for High Performing Organic Coatings on Aluminum Extrusions and Panels.

.7 AAMA 2603 – Voluntary Specification, Performance requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

.8 CAN/CSA S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members.

.9 CSSB1 50M-87, Lightweight Steel Framing Manual.

.10 CSSB1 52M-91, Lightweight Steel Framing Binder.

.11 National Building Code of Canada, 2015 (NBCC).

1.04 SUBMITTALS

.1 Submit panel material manufacturer’s printed product literature, specifications, data sheets and colour samples in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop details and erection drawings in accordance with Section 01 33 00. Shop drawings shall be sealed by a professional Engineer registered in British Columbia, referred herein as Specialty Engineer.

.2 Indicate profiles, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcements, details, and accessories.

.3 Where soffit panel components interface with equipment and other building elements, this section shall be responsible of obtaining all measurements of said items prior to preparation of

shop drawings.

.3 Engage a professional engineer licensed to practice in the Province of British Columbia who shall:

.1 Provide Schedule S-B and carry out enough timely and regular inspections to:

.1 Review fabrication and ensuring specified products are used.

.2 Ensure that manufacturer's design and installation specification as tested has been replicated.

.3 Ensure and certify installation meets the requirements of NBC (2015) for design, structural support, construction and installation.

.2 Issue a Letter of Certification (Schedule S-C) stating that the components have been fabricated and installed in accordance with design and Code requirements.

.3 The cost of the above engineering, inspections and issuing required Schedules S-B and S-C shall be included as part of the cost for work under this Section.

1.05 QUALITY ASSURANCE

.1 Single source Responsibility:

.1 Provide design and fabrication of wall panel system under responsibility of fabricator including soffit panels, attachments, clips, girts, fasteners, and other accessories.

.2 Panel Material Manufacturer Qualifications:

.1 Company specializing in producing aluminum finishes of type specified and Akzo Nobel, AAMA 2605 and 2605 Certified.

.2 Able to document minimum five (5) years experience.

.3 Fabricator/Installer Qualifications:

.1 Company specializing in designing, engineering, and fabricating work of this Section.

.2 Able to document minimum seven (7) years experience. Submit project contact information. Owner, General Contractor, Architect names and phone numbers. Project addresses.

.3 Approved by panel manufacturer in writing as qualified to perform work of this Section using specified product.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Deliver in manufacturers protective packaging with protective strippable film and identifying labels intact.

.2 Store in well ventilated space under cover, off ground, protected from direct sunlight, weather, moisture, soiling, and marring of surface.

.3 Handle to prevent twisting, bending, and abrasion. Prevent contact with materials which may cause discolouration or staining.

1.07 WARRANTY

.1 Soffit panel system fabricator/installer shall provide a two (2) year warranty.

.2 Panel material manufacturer shall provide a standard limited ten (10) year warranty against cracking, peeling, gloss and colour retention for wood finishes.

1.08 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.2 Do not dispose of unused sealant and adhesive materials into landfill.

.3 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.4 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling.

1.09 COMPATIBILITY

.1 Compatibility between components of soffit panel system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

1.10 COORDINATION AND PROJECT CONDITIONS

.1 Coordinate all work and engineered design of this Section with that of the following:

.1 Section 07 42 43 – Composite Wall Panel System where components of this section interface wall panels and related trim.

.2 Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

.1 Coordinate new soffit panel joints with existing. New and existing panel joints between adjacent panels are to be offset min. 600 mm.

.1 Remove additional existing soffit panels as required to ensure panel joints between adjacent panels are offset min. 600 mm.

1.11 DESIGN AND PERFORMANCE REQUIREMENTS

.1 Design soffit panel system in accordance with the latest edition of:

.1 CAN/CSA-S136 for the Design of Cold Formed Metal Structural Members.

.2 Specified loads, load factors and load distributions shall be in accordance with the 2015 National Building Code of Canada unless otherwise stated.

.3 SMACMA Manual: “Aluminum Sheet Metal Work in Building Construction” latest edition.

.4 Standards for Sheetmetal and Aluminum Flashing as published by CRCA and RCABC.

.5 Published directives and material/finish limitation of the panel material manufacturer.

.2 Design soffit panel system employing “limit states design” method.

.3 Components: Design and size to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of panel, conforming to NBCC 2015 for project location climatic conditions.

.4 Allowable Deflection: L/90.

.5 Thermal Movement: Design system to accommodate vertical and horizontal thermal movement of components without causing buckling, failure of joint seals, undue stress on fasteners, and oil canning when subject to seasonal temperature cycling. Systems that accommodate movement with enlarged/slotted attachment holes not accepted.

2 PRODUCTS

2.01 PANEL AND TRIM SHEET MATERIAL

.1 Wood grained aluminum soffit system to match existing, identified as #SP1 on the drawings:

.1 Aluminum sheet of thickness (minimum 1.5 mm) suitable for shop formed shape and for spans indicated and required.

.2 Finish: factory-applied proprietary wood grain bonded film finish to the following components:

.1 Pretreatment: E-CLPS Chrome Free five stage aluminum pretreatment system. Shall comply with AAMA-2603 AAMA 2604 and AAMA 2605 Superior Performance Standard

and must meet EPA, OSHA, and Government Environmental requirements and must not contain chromates, cyanides or other heavy metals.

.2 Bonded Sublimated Film Finishes: Wood Finishes employing polyurethane powder coat with ink based wood grain patterns sublimated into the base powder effectively tattooing the powder.

.3 Prepare surfaces, pre-treat and coat components in accordance with AAMA 2604 and 2605 Quality Standards for the coating material specified.

.4 Wrap and package coated components using methods suitable for transit and covered site storage without damage.

.3 All aluminum trim and flashings shall match formed panels.

.4 Acceptable product to match existing wood grained aluminum soffit system:

.1 Omniclad 7000 Series, colour 'Natural Walnut' manufactured by Lenmak Exterior Innovations, 10404-176 St., Edmonton, AB. Tel. Andrew Wilderman (780) 451 5482.

.2 Solid colour soffit system to match existing:

.1 Precoated sheet steel sheet of 22ga. thickness suitable for shop formed shape and for spans indicated and required.

.2 All aluminum trim and flashings shall match formed panels.

.3 Shape profile to match existing: 25mm deep, with 292mm (11.5") face plus 13mm (½") reveal.

.4 Acceptable product to match existing metal soffit system:

.1 25mm Mini-Reveal, manufactured by LAM Metal Contracting, 6962 Buller Ave, Edmonton, AB. Tel. (604) 430-3233.

.2 Colour to match existing.

2.02 FRAMING AND SUBGIRTS

.1 Sizes, gauges and spacing of all sub-framing and soffit panel attachment components shall be in strict accordance with reviewed shop/erection drawings and as directed by the Specialty Engineer.

.2 Subgirts shall be corrosion resistant either hat-shaped, 'C' or 'Z' sections of sufficient width to allow for attachment flexibility.

.3 Replace existing damaged subgirts as required.

2.03 ACCESSORIES AND TRIM

.1 Provide all associated flashing, trim and closures shop formed from same material as soffit panels.

.2 Attachments, clips and girts: as directed by fabricator's specialty engineer.

.3 Pop Rivets: (where required) Stainless steel or aluminum as determined by fabricator to prevent galvanic action.

.4 Screw Fasteners: Type S, self drilling, self tapping framing screws, stainless steel with carbide head, and as instructed by panel material manufacturer to suit application.

.5 Shims: As instructed by panel material manufacturer.

.6 Joint Sealant: Sealant and backer rod as specified Section 07 90 00 and as instructed by panel material manufacturer to contact metal to metal.

.7 Isolation Accessories: Isolation tape, pads, or coatings as necessary to prevent galvanic action between dissimilar metals.

.8 Blackout scrim at interior soffit panels: non-flammable black woven fabric applied to upper side of panels.

2.04 SOFFIT VENT/TRIM

.1 To match existing size, profile and material.

.2 As detailed, moulded PVC or Aluminum continuous soffit vent strip, 90 mm wide, with 3.2 mm diam. holes yielding 50% free air.

.3 Finish: vinyl-safe, paintable black.

2.05 FABRICATION

.1 Shop fabricate soffit panels and trim in sizes and configurations as shown and in accordance with reviewed shop drawings.

.2 Form panel lines, breaks, and angles free from warp and buckle, and with no displacement of aluminum sheet.

.3 Form sections true to shape, accurate in size, square, and free from distortion or defects.

.4 Employ bending/breaking and shearing techniques which will cause the least amount of abrasion and damage to the panel finish. Finish material must be free of draught and die markings.

.5 Panel Dimensions: Make allowances for field adjustments as recommended by panel material manufacturer, where final dimensions cannot be established by the field measurement before completion of panel manufacturing.

.6 Panel lines, breaks and angles shall be sharp, true and surfaces free from warp, twist, kinks, dents or buckle.

3 EXECUTION

3.01 EXAMINATION

.1 Examine substrate surfaces to receive aluminum soffit panel system and associated work and the condition in which work will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer, manufacturer and Departmental Representative.

.2 Report any discovered discrepancies to the Departmental Representative so that instructions may be given for the necessary remedial work.

3.02 PREPARATION

.1 Prepare substrate surfaces to insure proper and adequate installation in accordance with the contract documents. Reviewed shop drawings, and specialty engineer's written requirements and instructions.

.2 Field measurement and verification of dimensions are required.

.3 Protect adjacent elements and surfaces from damages as a result of the work of this section.

.4 Replace existing damaged subgirts as required.

.5 Install subgirts, furring, and other miscellaneous soffit panel support members and anchorage according to ASTM C754, specialty engineer's written instructions and reviewed shop and erection drawings.

3.03 ERECTION GENERAL

.1 Install aluminum soffit panel system in strict accordance with specialty engineer's written instructions and reviewed shop and erection drawings to produce a complete assembly.

.2 Erect panels true and level and in correct alignment with established lines and elevation shown on reviewed shop and erection drawings.

.3 Install all girts, clips, anchors, and flashing securely to surrounding construction spaced to afford maximum rigidity.

.4 Permanently fasten and anchor soffit panel system to suspended structural framing system using

anchors, clips, and girts.

.5 Use concealed fasteners and clip attachments.

.6 Install backer rod and silicone joint sealant as necessary for permanent, weathertight joints at interfacements with adjacent construction, as specified in Section 07 90 00.

.7 Isolate aluminum from dissimilar metal, as required to prevent galvanic action.

.8 Remove protective film immediately following installation of soffit panels.

3.04 INSTALLATION TOLERANCES

.1 Maximum Offset from Alignment Between Adjacent Panels: 3 mm.

.2 Maximum Variation from Horizontal Plane: 10 mm in 6 meters, non-accumulative.

3.05 ADJUSTMENTS

.1 Make adjustments to soffit panel installations not conforming to specified tolerances.

.2 Replace work which cannot be repaired so that repairs are not discernable at distance of 300 mm.

3.06 FIELD QUALITY CONTROL

.1 The manufacturer's or supplier's professional Specialty Engineer shall be responsible for periodic inspections during construction as required. Such inspections and associated costs shall be included in the Contract.

.2 Letters of Assurance at completion of work: the Specialty Engineer who seals the shop drawings submission shall submit Schedule S-C. Written inspection reports of field review shall be submitted to the Departmental Representative by the Specialty Engineer.

3.07 CLEAN-UP

.1 Dry-wipe panels as work progresses.

.2 Remove manufacturer's protective film at appropriate time in advance of the date of substantial performance of the Project. Review concurrently to ensure there is no damage or marring to the wall panels. Replace damaged or marred panels accordingly to the approval of the Departmental Representative.

.3 Clean panels to remove surface dust, dirt, stains and marks on the panels caused by ambient environmental weather conditions and construction activities. Use cleaners approved by the manufacturer's of surfaces to be cleaned. Protect panels from damage by other trades.

.4 At the completion of the work of this Section, remove any excess materials, debris and equipment, pertaining to the work of this Section, from the site.

END OF SECTION

1 GENERAL

1.01 SECTION INCLUDES

.1 All materials, equipment and installation for two-ply elastomeric modified bituminous membrane systems (SBS) to new sloped structure steel decked roofs including combination sheathing board/air/vapour barrier, base and cap plys, associated membrane flashing (stripping plys), and traffic walkways.

.2 Rigid polyisocyanurate thermal roof insulation, (factory-tapered for crickets, back-slopes and where indicated) and mineral fibre insulation/protection layer.

1.02 RELATED SECTIONS

.1 Section 01 45 00 – Quality Control.

.2 Section 01 74 19 – Waste Management and Disposal.

.3 Section 01 78 00 – Closeout Submittals.

.4 Section 07 62 00 – Sheet Metal Flashing and Trim.

.5 Section 07 90 00 – Sealants.

.6 Structural Specifications.

1.03 REFERENCES

.1 The latest version of the following tests and publications:

.2 American Society for Testing and Materials International (ASTM).

.1 .1 ASTM D6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.3 Canadian General Standards Board (CGSB).

.1 CGSB 37-GP-56M-80b (A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced Roofing.

.2 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

.4 CGSB 37-GP-56M-80, Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.5 CAN/ULC-S704-03, Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

.4 Canadian Roofing Contractors Association (CRCA).

.1 CRCA Roofing Specifications Manual – Latest Edition

.5 Roofing Contractors Association of British Columbia (RCABC)

.1 Roofing Practices Manual – Latest Edition

.6 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act, 1999 (CEPA)

.7 Factory Mutual (FM Global).

.1 FM Approvals – Roofing Products.

.8 Health Canada / Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.9 National Building Code of Canada, 2015 (NBCC).

1.04 PERFORMANCE REQUIREMENTS

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

.2 The roof assemblies shall have a minimum Class A designation in accordance with NBCC, 2015 (3.1.15.2.1) and ULC S107.

1.05 SUBMITTALS

.1 All submittals shall be 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 in accordance with Section 01 35 33 – Health and Safety Requirements.

.1 Indicate VOC content for:

.1 Primers

.2 Asphalt

.3 Sealers

.4 Tapered Insulation

.4 Provide layout for factory-tapered insulation.

.5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.6 Provide to the Owner the "RCABC Roofing System Record" upon completion of the work. Record shall include guarantee, copies of inspection reports and roof maintenance guide.

.7 Submit copies of underwriter's certification for roof covering materials.

1.06 QUALITY ASSURANCE

.1 Unless otherwise specified, all materials and roofing practice shall conform to the recommendation of the RCABC as contained in their manual, Roofing Practices in British Columbia. Where this manual is silent, the recommendation of the CRCA as contained in their manual Roofing Specifications, shall be followed.

.2 This Contractor shall at all times, have in his Field Office, a copy of said manuals.

.3 All work shall be done by a member of the Roofing Contractor's Association of British Columbia and in accordance with the manufacturer's instructions and latest standards of RCABC

.4 All work of this section shall be installed only by workers, foremen, superintendents and management, whose workmanship is approved by the membrane manufacturer and supplier. Proof of such approval and of the experience of such personnel shall be submitted to the Departmental Representative prior to the start of the work.

.5 Obtain all roofing materials from the same source to ensure compatibility.

.6 Roofing and sheet metal work shall be performed in conformance with the roofing manufacturer's written recommendations, as well as the requirements of the ULC laboratories, Factory Mutual FM-190 and CGSB 47-GP-56M (latest).

.7 The manufacturer of elastomeric bitumen products shall provide proof of ISO9001 Certification.

1.07 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 33 – Health and

Safety Requirements.

1.08 PRODUCT DELIVERY, STORAGE & HANDLING

.1 Deliver and store all materials in their original containers in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Store materials in weatherproof shelters, having floors which will protect the materials from moisture. Store rolled materials on ends. Avoid prolonged exposure of light and heat sensitive materials to sunlight. Remove only as much material from storage as can be applied and made weathertight in the same day.

.3 Do not place roof insulation in direct contact with the earth, road surface, or roof deck. Place suitable supports under the insulation upon delivery to protect it from absorbing dampness.

.4 Do not store materials in concentrations which exceed design live load.

.5 In the event material is damaged by the elements, improper handling or other causes, such material will be rejected and shall be replaced at no extra cost to the Departmental Representative.

.6 Place plywood runways over completed Work to enable movement of material and other traffic.

.7 Store sealants at +5 degrees C minimum.

.8 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

1.09 PROTECTION

.1 Respect safety measures described in the manufacturer's written directives, as well as RCABC written recommendations.

.2 At the end of each work day, use an infrared detector to spot any smoldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.

.3 Never apply the torch directly to dry wood surfaces. Comply with the fire safety recommendations of the manufacturer and the RCABC.

.4 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 meters of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – 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 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 Laws and 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 materials from landfill to recycling facility as approved by Departmental Representative.

.10 Unused adhesives, sealant, and asphalt materials must not be disposed on 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 Departmental Representative.

1.11 CO-OPERATION WITH OTHER TRADES

.1 Advise all other trades of their responsibility in having pipes, sleeves, A/C unit fan, and cowl bases installed on the roof in adequate time so that the roofing work is not delayed. Coordinate roofing with mechanical and electrical trades.

.2 The mechanical trades shall be responsible for cap and counterflashing of any ducts, vents, stacks, or other sheet metal projecting through the roof. This section shall provide base flashing over wood or metal curbs, etc., and seal lead flashings for service lines into the roof members.

1.12 JOB CONDITIONS

.1 Conform to the ambient air temperature and humidity requirements and limitations as set forth by the membrane system manufacturer, the RCABC and the Roofing Inspection Agency for installation of all systems and materials.

.2 Minimum installation air temperature for solvent-based adhesives and compounds is (-) 5 degree C.

.3 Protect roof decks from damage due to roofing or sheet metal operations. Protect work of other trades from damage; replace and/or make good any and all such damages caused by work of this section.

.4 Protect all adjacent surfaces and work during roofing from damage, with special protection adjacent to hoist.

.5 Inspect surfaces to receive work of this section and report any defects in writing to the Departmental Representative.

.6 Commencement of work will imply acceptance an approval of such surfaces and no claim for defects in workmanship will subsequently be allowed.

.7 Provide all temporary tarps and structures, at no additional cost to the Departmental Representative, required to protect building and roofing from weather conditions, which may cause a delay in meeting project schedules.

1.13 INSPECTION & WARRANTY

.1 The Contractor shall, at no additional cost to the Departmental Representative, arrange for the supplier/manufacturer of the membrane system, to inspect the work in progress after base sheet installation and during seaming, and upon completion, to ensure that the complete system is installed in full compliance with the supplier's/manufacturer's specifications, recommendations, and details.

.2 For Work of this section, the 12 months warranty period is replaced by RCABC 10 year Installation Guarantee for membrane systems at the completion of the Work. Roof inspection shall be performed by an independent inspection agency appointed by the Departmental Representative. Costs for inspections and warranty shall by paid for by the Contractor. Inspection service shall include additional inspection of roof immediately prior to interim completion of this Contract.

.3 The Contractor shall co-operate with the appointed inspection agency; provide material samples when requested and provide access to the work in progress.

.4 The Contractor shall obtain from the manufacturer of the elastomeric bitumen membrane system, a written warranty stating that its products are free of manufacturing defects and shall provide a waterproof surface for 20 years after installation. If infiltration happens due to faulty material, the manufacturer shall make the necessary repairs, at its expense.

2 PRODUCTS

2.01 COMPONENT COMPATIBILITY

.1 Ensure that all components of the membrane systems are compatible. All membrane, accessories and associated mastic/sealant compounds shall be products of the same manufacturer.

2.02 COMBINATION FIRE BARRIER SHEATHING BOARD/VAPOUR BARRIER

.1 In addition to providing a flat surface to steel decking, the board shall act as a thermal barrier to protect roof components from fire within the building while also providing protection as a vapour barrier.

.2 The 18 mm thick thermal barrier steel deck sheathing board shall be composed of a non- woven polyester-reinforced SBS modified bitumen membrane factory-laminated to a high density mineral fibre (rock wool) core. Board shall be mechanically fastened to steel decking. Supply complete with manufacturer's standard fixings and plates ("Soprafix" system).

.3 Properties of the factory-laminated membrane, in accordance with CAN/CGSB-37.56-M, 9th draft, are as follows:

Property	**Value**
Membrane thickness	2.2 mm (86.6 mil)
Weight/m^2	2.6 kg/m^2 (0.53 lb/ft^2)
Breaking strength, MD XD	17.0 / 12.5 kN/m
Ultimate elongation, MD/XD	60 / 65%
Tear strength	60 N
Static puncture resistance	400 N
Dimensional stability	-0.4 / 0.3 %
Plastic flow	≥ 115°C (239°F)
Cold bending at -30°C (-22°F)	No cracking
Lap joint strength	Pass > 4 kN/m
Water vapor permeance ASTM E96 Procedure B	<0.21 ng/Pa•s•m^2 (<0.004 perm)

.4 Properties of the high density mineral fibre board are as follows:

Property	**Standard**	**Value**
Board thickness	-	15.8 mm (5/8 in)
Thermal resistance (RSI Value-for 25.4 mm at 24°C (75°F)	ASTM C518 (C177)	0.70 m^2K/W(R-4.0 hr•ft^{2}•°F/BTU for 1 in at 24°C(75°F))
Compressive strength at 10% at 25 % 25.4 mm (1 in) thickness	ASTM C165	85 kPa (12 psi) 190 kPa (28 psi)

Density	ASTM C612-09	200 kg/m^3 (12.5 lb/ft^3)
Dimensional stability, Linear shrinkage 24 hours at 650°C (1200°F)	ASTM C356	1.1%
Water absorption	ASTM C209	1.0%

Water vapour sorption	ASTM C1104	0.29%

.5 An example of the product is "Xpress Vap'r Board" manufactured by Soprema waterproofing. Other products having the same characteristics will not be excluded.

2.03 ROOF INSULATION (BASE/INTERMEDIATE LAYERS)

.1 High strength moulded closed cell polyisocyanurate foam core integrally laminated to heavy, black, non-asphaltic fibre reinforced glass facers, adhered to substrate.

.2 Insulation shall conform to CAN/ULC-S704-2001 Const No. C34 and CAN/ULC-S770- 2000 for determination of long term thermal resistance of closed cell insulating forms and shall meet or exceed the physical property values from the following table:

PROPERTY	TEST METHOD	VALUES
Dimensional Stability (Length and Width)	ASTM D2126	<2%
Compressive Strength (10% Deformation)	ASTM D1621	140 kPa
Water Absorption	ASTM C209 ASTM D2842	<1% <3.5%
Moisture Vapour Transmission	ASTM E96	<1.5 perm (85.0 ng/(Pa•s•m^2))
Product Density	ASTM D1622	Nominal 32.04 kg/m^3
Flame Spread	ASTM E84 (Full 10 min. Test)	25-50**
Smoke Developed	ASTM E84 (Full 10 min. Test)	50-170**
Tensile Strength	ASTM D1623	>35 kPa
Service Temperature	-	-73 to 122°C

.3 Insulation shall be engineered factory-tapered to create crickets, back slopes and where indicated. Insulation thicknesses: 50 mm base layer, 75 mm intermediate layer.

2.04 MINERAL FIBRE INSULATION PROTECTION LAYER

.1 Mineral wool board, made from basalt rock and slag, with bitumen-impregnated rigid upper face compatible with roofing membranes and resistant to torch application of base roofing ply.

.2 Applied as top layer (102 mm thick) over base and intermediate layers of polyisocyanurate insulation as protection from "insulation creep" and complying with following Table of Properties:

Property	Test Method	Values
Thermal Resistance (RSI Value – m^2K/W for 25.4 mm at 75°F)	ASTM C518 (C177)	0.68 m^2K/W (R-3.8 hr ft^2 F / BTU for 1 in 75°F)
Compressive Strength - Top Layer at 10% - Top Layer at 25% - Entire Board (3 in Thickness) at 10% - Entire Board (3 in Thickness) at 25%	ASTM C165	 139 kPa (20.2 psi) 252 kPa (37.0 psi) 71 kPa (10.3 psi) 103.5 kPa (150 psi)
- Point load at 5 mm compression	EN 12430	205 kPa (30.0 psi)

Density - Top Layer - Bottom Layer * Formed as a monolithic structure	ASTM C612-09	13.75 lb/ft^3 (22 kg/m^3) 10.0 lb/ft^3 (160 kg/m^3)
Dimensional Stability, Linear Shrinkage 24 hours at 1200°F (650°C)	ASTM C356	0.71%
Water Absorption	ASTM C209	<1.0%
Water Vapor Sorption	ASTM C1104	0.15%

.3 Acceptable products:

.1 "Soprarock DD Plus" by Soprema.

.2 "Toprock DD Plus" by Roxul.

.3 Other products with the same demonstratable characteristics will not be excluded.

2.05 ADHESIVE

.1 Adhesive for securing roof insulation: two-part polyurethane foamed adhesive as acceptable to manufacturers of all components to be bonded and to RCABC.

.2 An example of the product is "Duo Tack" by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

2.06 MEMBRANES

.1 All membranes must meet or exceed ASTM D6162, CSA A123.21-10, FM4470, CAN/CGSB 37.56 M, ULC-S107.

.2 Base Sheet (and Base Stripping Ply at Non-Combustible Substrates):

.1 Membrane shall be composed of a composite reinforcement and SBS modified bitumen, 2.5 mm thick, with both faces covered with a thermofusible plastic film. This membrane shall be torch-applied.

.2 Reinforcement: composite.

.3 Elastomeric asphalt: mix of selected bitumen and minimum 12% SBS thermoplastic polymer.

.4 Physical properties: (as per CAN/CGSB-37.56-M, 9th Draft)

	Properties	**MD**	**XD**
.1	Strain energy	7.8 kN/m	7.2 kN/m
.2	Breaking strength	15 kN/m	13.5 kN/m
.3	Ultimate elongation	60%	65%
.4	Tear resistance	125 N	
.5	Static puncture resistance	560 N	
.6	Dimensional stability	-0.2%	0%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	

.5 An example of the accepted product is "Sopra ply Base 520" by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

.3 Self-Adhesive Membrane:

(Base Stripping Ply at Combustible Substrates and Where Required)

.1 Membrane shall be self-adhesive SBS modified bitumen, with composite reinforcement, covered

with a thermofusible plastic film. Membrane shall be available in both summer and winter grades. Thickness: 3.0 mm.

.2 Physical properties: (as per CAN/CGSB-37.56-M, 9th Draft)

.1	Strain energy, MD/XD (kN/m)		7.8 / 7.2
.2	Breaking strength, MD/XD (kN/m)		15 / 13.5
.3	Ultimate elongation, MD/XD (%)		60 / 65
.4	Tear resistance (N)		125
.5	Static puncture (N)		560
.6	Cold bending (C)	- Initial	-30
		- 90 days at 70°C	-30

.3 Acceptable products is “Sopralene Flam Stick” for base sheet flashings, and “Soprabase 520” for base sheet field area, by Soprema Waterproofing to match existing.

.4 Cap Sheet:

.1 3.7 mm thick Styrene Butadiene Styrene (SBS) high performance membrane shall have a composite reinforcement and thermofusible elastomeric asphalt. Under side shall be protected by a thermofusible plastic film. This membrane shall be applied by torching only. Top surface of membrane shall be covered with highly reflective white granules. Membrane shall be factory-treated with fire retardant.

.2 Membrane shall have a minimum SRI of 86 regarding heat island.

.3 Physical Properties: (as per CAN/CGSB-37.56-M, 9th Draft).

	Properties	**MD**	**XD**
.1	Strain energy	11.9 kN/m	9.5 kN/m
.2	Breaking strength	19.5 kN/m	15.1 kN/m
.3	Ultimate elongation	61%	75%
.4	Tear resistance	70 N	
.5	Static puncture resistance	470 N	
.6	Dimensional stability	-0.2%	0.1%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	
.10	SRI (ASTM E1980)	86	

.4 Acceptable product is “Soprastar Flam HDGR FR” by Soprema Waterproofing to match existing.

2.07 ACCEPTABLE MEMBRANE SYSTEM MANUFACTURERS

.1 Soprema.

2.08 CATALYZED RESIN LIQUID FLASHING SYSTEM

.1 Multi-component, fully reinforced, flexible polymethyl methacrylate-based (PMMA) liquid flashing membrane system by same manufacturer as roofing membranes and complying with the following Table of Properties.

Property	**Test Method**	**Values**
Membrane thickness	ASTM D5147 Sec 5	2.9 mm (115 mils)
Peak load @ 23°C (73°F) avg.	ASTM D5147 Sec 6	12.3 kN/m (70 lbf/in)
Elongation @ peak load, avg.	ASTM D5147 Sec 6	42%
Peak load @ 23°C (73°F) avg.	ASTM D412 (dumbbell)	15.8 kN/m (90 lbf/in)

Elongation @ peak load, avg.	ASTM D412 (dumbbell)	55%
Shore A hardness, avg.	ASTM D2240	81
Water absorption, (Method I) (24h @ 23°C (73°F))	ASTM D570	0.41%
Water absorption, (Method II) (48h @ 50°C (122°F))	ASTM D570	1.57%

Low temperature flexibility	ASTM D5147 Sec 11	-25°C (-13°F)
Dimensional stability (max. movement)	ASTM D5147 Sec 10	-0.063%
Tear strength	ASTM D5147 Sec 7	0.5 kN (107 lbf)

.2 Liquid flashing shall be available in “summer” and “winter” grades, be supplied with companion primer for non-metallic substrates, catalyst and fleece reinforcement. Employ where noted and required.

.3 Acceptable product is “Alsan RS230 System” by Soprema.

2.09 SEALANTS

.1 As approved by membrane system manufacturer and by RCABC as being compatible with membrane system.

.2 Plastic cement: asphalt, to CAN/CGSB-37.5 coal tar, to CGSB 37-GP-19M.

.3 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.

.4 Refer to section 07 90 00 – Sealants.

2.10 TRAFFIC WALKWAYS & ROOF EDGE DANGER ZONE MARKING

.1 Where shown on drawings as walkways, and surface protection: additional ply of granular-faced cap stripping ply, material in contrasting colour to cap membrane, torch- applied over cap sheet. Minimum 900 mm wide. (Use membrane roll width).

.2 Where shown on the drawings: delineate a 3048mm wide danger zone around roof perimeter by employment of a contrasting colour cap sheet membrane.

2.11 FASTENERS AND ACCESSORIES

.1 Fasteners for mechanically fastening fire barrier sheathing board to steel roof deck shall be wind uplift and corrosion-resistant type as recommended and acceptable to the board manufacturer and to RCABC.

.2 Fire Protection Tape: Fire retardant treated, 165 mm wide tape, composed of glass fleece reinforcement and SBS bitumen. The top side is sanded and the bottom side is covered with a silicone release film.

.3 Splash Blocks: for use where scuppers from elevated roofs spill onto main roof. 600 x 600 x 50 mm stock pre-cast lightweight concrete patio pavers.

3 EXECUTION

3.01 WORKMANSHIP - GENERAL

.1 All workmanship shall be at least in accordance with RCABC standards for a 10 year guarantee for the various systems described.

.2 Use materials and systems in accordance with manufacturer’s specifications and instructions.

.3 Leave no work exposed during unsettled weather. Glaze and finish membranes at end of each work period, to direction of roofing inspector.

.4 Work to; and around all features, voids and edges, in best trade manner to produce watertight and weatherproof insulation.

.5 Follow approved stripping and membrane flashing methods at eaves, curb, parapets, etc., in accordance with RCABC system guidelines.

.6 All seams of granular surfaced cap membranes and wall covering shall be carefully heat welded with propane torch. No visible bleed-out of bitumen will be accepted. Bleed-out at joints shall be covered with granular material to match cap sheets. Surfaces when completed shall present a neat, even appearance.

.7 Apply only as much insulation to the roof as can be covered the same day with roofing membrane. At the conclusion of each day's work, seal exposed edges of the roof insulation. This seal shall be cut and lifted upon continuation of the work.

.8 Do priming for modified asphalt roofing in accordance with CGSB 37-GO-15M.

3.02 EXAMINATION OF ROOF DECKS

.1 Before commencing roofing work, this section, together with the Departmental Representative and the Contractor, shall inspect all surfaces scheduled to receive membranes for condition, slopes, nailing supports, sheet metal parapet facing, roof drains, stack vents, mechanical and electrical penetrations, building joints, etc.

.2 All surfaces must be smooth, dry, clean and free of ice and debris. No salt or calcium shall be used to remove snow or ice.

.3 Surfaces scheduled to receive membranes must possess a smooth surface with an even finish; free of excessive moisture, ridges, hollows and sharp corners.

.4 If defects are found, a non-compliance notice will be issued to the Contractor so that adjustments can be made. Proposals for correction of defects shall be submitted to the Departmental Representative for approval.

.5 Corrections of defects shall be made at no additional cost to the Departmental Representative using materials which adhere to the substrate, are stable, do not deform under traffic loads and are compatible with bituminous materials. The deck must be clean, dry, and free of contamination by treatment products, lubricating oils, diesel oil or grease, which could affect the adhesion of the waterproofing or the physical integrity of the membrane itself.

.6 Commencement of roofing/waterproofing work shall imply acceptance of surfaces and conditions.

3.03 PREPARATION

.1 Supply to the various sections concerned in ample time: all inserts, reglets, and accessories required to be built into the work of other sections. Instruct as to the proper location and position of such items.

.2 Co-operate with, and coordinate work with Mechanical trades and other providers of interfacing materials and systems to ensure watertight junctions at roof drains, vents, and other items passing through the roof.

.3 Minimize exposure of the roof deck to the elements by proceeding as soon as the roof deck is completed. Do not work during rain, fog, sleet, ice, or snow. Warm roofing materials before using in cold weather.

.4 Sweep clean and remove all debris from roof deck surfaces before commencement of work.

3.04 EQUIPMENT

.1 Maintain all equipment and tools in good working order.

.2 Use torch types recommended by the manufacturer of the elastomeric asphalt membranes, and acceptable to RCABC and ULC.

3.05 ROOFING SYSTEM DESCRIPTIONS

.1 Roof Assembly Type 'R-1' (Class A-Insulated):

.1 Combination fire barrier sheathing board/vapour barrier mechanically fixed to steel decking.

.2 Two layers (50 and 75 mm) polyiso roof insulation adhesive-applied, factory- tapered at crickets

and back-slopes.

.3 One-layer 75 mm mineral fibre insulation/protection, adhesive-applied with joints staggered from those of previous layer.

.4 Base sheet torch applied.

.5 Granular cap sheet torch applied.

.6 Stripping and membrane flashing, granular-surfaced where exposed to view.

.7 Traffic deck, torch-applied.

.8 All Parapets and Vergers:

.1 Prepare and prime sheet metal parapet facing.

.2 Torch-applied base stripping ply full height

.3 Granular cap sheet torch-applied

.2 Roof Assembly Type 'R-2' (un-insulated):

.1 Fire barrier sheathing board mechanically-fixed to steel decking.

.2 Base sheet torch-applied.

.3 Granular cap sheet torch-applied.

.4 Stripping and membrane flashing, granular-surfaced where exposed to view.

.5 All Parapets:

.1 Prepare and prime treated plywood nailers and sheet metal parapet facing.

.2 Self-adhesive base stripping ply full height on combustible substrates, torch-applied on non-combustible.

.3 Granular cap sheet torch applied.

3.06 COMBINATION FIRE BARRIER SHEATHING BOARD/VAPOUR BARRIER INSTALLATION

.1 Install board with long side of sheet resting on and perpendicular to direction of flutes in deck. Short side shall rest on top of flute. Ensure edges are butted tightly.

.2 Stagger end joints a minimum of 600 mm.

.3 Secure board in place with self-drilling non-corrosive screws and companion plates applied at the spacing specified by the board manufacturer and acceptable to RCABC.

3.07 PRIMER APPLICATION

.1 Apply all primers in accordance with the manufacturer's directions to all surfaces prior to application of membranes and other roofing components.

3.08 Fire Retardant Tape Application (where required)

.1 Prior to the application of any torch on base sheet materials, install a width of tape over substrate cracks, voids in the construction, angle changes at curbs, parapets, penetrations, walls, and penetrations to prevent contact of flame with combustible materials or construction debris.

3.09 INSULATION INSTALLATION

.1 Insulation: adhesive application.

.1 Apply insulation in following order: 50 mm polyisocyanurate base layer, 75 mm polyisocyanurate intermediate layer and 75 mm mineral fiber top layer.

.2 Adhere insulation to substrate and preceding layers using adhesive applied in accordance with

manufacturer's instructions, Factory Mutual and RCABC requirements.

.3 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.4 Cut end boards to suit.

3.10 MEMBRANE APPLICATION

.1 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 torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.

.3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.

.4 Application shall be free of blisters, wrinkles, and fish mouths.

.2 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 shall be free of blisters, fish mouths and wrinkles.

.3 Membrane Flashing (Stripping Plies) Application:

.1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.2 Apply base and cap sheet onto substrate in 1-meter wide strips.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal.

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.

.5 Provide 75 mm minimum side lap and seal.

.6 Torch-weld cap stripping ply and base stripping at non-combustible substrates. Self-adhesive-apply base stripping to combustible substrates.

3.11 INTERIM COMPLETION INSPECTION

.1 Inspect the roofs at or just before the date of substantial completion. Remove all nails and other debris which will cause damage to roof membranes. Ensure the roof has not been damaged by construction activities and the interfacing with the existing roof membrane system is complete and free of any defects. Leave the entire roof ready for final inspection by Inspection Company.

.2 Provide the Departmental Representative with a written certificate that this inspection has been completed.

3.12 ADJUST AND CLEAN

.1 Repair, remove and clean all drips or smears of adhesive and asphalt on exposed finished surfaces or surface to be subsequently finished. Clean off immediately as directed by Departmental Representative.

.2 As the work progresses and at completion of the work, clean up and remove from the site, all rubbish and debris resulting from roofing and sheet metal work.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 07 27 13 – Self-Adhesive Membrane.

.3 Section 07 42 43 – Composite Wall Panel System.

.4 Section 07 42 93 – Soffit Panel System.

.5 Section 07 52 00 – Modified Bituminous Membrane Roofing.

.6 Section 07 90 00 – Sealants.

1.02 REFERENCES

.1 American Society for Testing and Materials (ASTM International).

.1 ASTM A653/A653M03, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Roofing Practices Manual as published by the Roofing Contractors Association of British Columbia.

.3 Sheet Metal and Air Conditioning Contractor's National Association, Inc., "Architectural Sheet Metal Manual" (SMACNA).

1.03 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.

.2 Samples:

.1 Submit 100 x 150 mm samples of each type of sheet metal material, colour and finish.

.2 Colour and finish to match existing.

2 PRODUCTS

2.01 SHEET FLASHING MATERIALS

.1 Zinc coated steel sheet: Commercial quality to ASTM A653/A653M, with Z275 designation zinc coating, shop-spray-painted with a PPG Fluoropolymer coating (refer to Section 09 90 00 – Painting and Coating). Colour as selected by Departmental Representative to match interfacing wall panels.

.1 Metal thickness shall be minimum 24 gauge or to match existing, but adjusted to accommodate use and span in order to yield a smooth, non oil-canned surface.

.2 “Sheathing” at roof parapets shall be as per 2.1.1, minimum 1.22 mm thick, un- painted galvanized steel sheet.

.3 Colour: to match existing.

.2 Aluminum sheet: proprietary minimum 22-gauge utility sheet or to match existing, plain pattern, to CAN/CGSB 93.1 clear anodized to match aluminum composite wall panels and glazing systems where associated with those systems.

2.02 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.3 Self-adhered Membrane: as per Section 07 27 13.

.4 Sealants: In accordance with Section 07 90 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, 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.

2.03 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable RCABC details, SMACNA details and as indicated.

.2 Form pieces in 2438 mm maximum lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 13 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.

2.04 METAL FLASHINGS AND FORMED SHEET METAL

.1 Form flashings, copings, cap flashings and fascias to profiles indicated and to match existing, from minimum 24-gauge material, or to match existing. (22 gauge for aluminum).

.2 Form reglets, gum pockets, clamping bars and other members shown on drawings from zinc alloy of sufficient thickness to safely produce a weather tight seal with workmanlike appearance.

.3 Form roof edge metal upstands (“Sheet Metal Parapet”) or other descriptions noted on drawings to match existing profiles, from minimum 1.22 mm thick galvanized steel or as otherwise noted thickness on drawings.

2.05 OVERFLOW SCUPPERS

.1 Form scuppers from min. 22-gauge thick material.

.2 Sizes and profiles as indicated and as per requirements of RCABC and SMACNA.

.3 Provide necessary fastenings.

3 EXECUTION

3.01 INSTALLATION OF SELF ADHERED MEMBRANE UNDERLAYMENT

.1 Inspect self-adhered membrane (Section 07 27 13) for damage upon delivery to site. Replace defective material.

.2 Install membrane as detailed in strict accordance with manufacturer's written directions.

.3 Prior to installation of membrane cover all exposed fasteners, sharp corners and other similar conditions detrimental to the membrane with small strips or patches of membrane to prevent sharp edges from penetrating finished membrane.

.4 Install membrane under cap flashings and over upper leg of cross cavity flashings.

3.02 INSTALLATION

.1 Install sheet metal work in accordance with RCABC details, SMACNA details and as indicated.

.2 Use concealed fastenings except where approved before installation.

.3 Counter flash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock seams forming tight fit over hook strips, as detailed.

.4 Use standing seams at corners.

.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 flashings to form weather tight junction.

.8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25mm (1”). Lead wedge flashing securely into joint.

.9 Caulk flashing at reglet and cap flashing with sealant.

3.03 INSTALLATION OF SCUPPERS

.1 Install scuppers as indicated and to requirements of RCABC and SMACNA.

END OF SECTION

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1 GENERAL

1.01 SUMMARY

.1 This section specifies standards for caulking and sealants applied by this and other sections.

1.02 RELATED REQUIREMENTS

.1 Section 07 42 43 – Composite Wall Panel System.

.2 Section 07 42 93 – Soffit Panel System.

.3 Section 07 62 00 – Metal Flashing and Trim.

1.03 REFERENCES

.1 CAN/CGSB-19.13-M87 Sealing Compound, One-component, Elastomeric, Chemical Curing.

.2 CGSB 19-GP-14M-76 Sealing Compound, One Component, Butyl-polyisobutylene Polymer Base, Solvent curing.

.3 CAN/CGSB-19.17-M90 One-Component Acrylic Emulsion Base Sealing Compound.

.4 CAN/CGSB-19.21-M87 Sealing and Bedding Compound Acoustical.

.5 CAN/CGSB-19.22-M90 Mildew Resistant, Sealing Compound for Tubs and Tiles.

.6 CAN/CGSB-19.24-M90 Multi-component, Chemical Curing Sealing Compound.

1.04 SUBMITTALS

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

.2 Product Data: submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide electronic copies of Workplace Hazardous Materials Information System (WHMIS) - Safety Data Sheets (SDS) in accordance with Section 01 35 33 - Health and Safety Requirements.

.4 Manufacturers Reports:

.1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance with specifications.

.5 Closeout Submittals: in accordance with Section 01 78 00 - Closeout Submittals.

.1 Warranty:

.1 Provide manufacturers’ standard year warranties as follows:

.1 20-year warranty for silicone sealants.

.2 10-year warranty for multi-component urethane sealants.

.3 5-year warranty for acrylic latex and acoustical sealants.

.2 Warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

.2 Operating & Maintenance Manuals:

.1 Submit operating and maintenance data for incorporation into manual and include following:

.1 Manufacturer's product number, product name, colour, type and use.

1.05 ENVIRONMENTAL AND SAFETY REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.

.2 Comply with requirements specified in the following sections:

.1 Section 01 35 43 – Environmental Procedures

.2 Section 01 74 19 – Waste Management and Disposal

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

.4 Sealant and substrate materials to be minimum 5o C.

.5 Should it become necessary to apply sealants below 5o C, consult sealant manufacturer and follow their recommendations.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

2 PRODUCTS

2.01 SEALANT MATERIALS

.1 Where sealants are qualified with primers use only these primers.

.2 Use only non-staining sealants.

.3 Sealants acceptable for use on this Project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.02 SEALANT MATERIAL DESIGNATIONS

.1 Urethanes One Part.

.1 Self-Levelling to CAN/CGSB-19.13, Type 1, colour as selected from manufacturer's standard range of colours.

.2 Urethane one Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-40, colour as selected from manufacturer's standard range of colours.

.3 Silicones One Part.

.1 To CAN/CGSB-19.13.

.2 To CAN/CGSB-9.22 (Mildew resistant).

.4 Silicone Strip Sealant

.1 At heads of all aluminum curtainwall, Section 08 44 00:

.2 Approved product: Dow Corning "123 Silicone Seal".

.5 Acoustical Sealant

.1 To CAN/CGSB-19.21

.6 Butyl.

.1 To CGSB 19-GP-14M

.7 Acrylic Latex One Part.

.1 To CGSB 19-17.

.8 Preformed Compressible and Non-Compressible back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 40 to 50%.

.2 Neoprene or Butyl Rubber.

.1 Round solid of 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/m^3 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.

2.03 SEALANT SELECTION

.1 Coping joints and coping-to-façade joints & flashing joints: Sealant type: butyl.

.2 Colour of sealants: selected by Departmental Representative from manufacturer’s standard range to match adjacent surfaces.

.3 Joint cleaner: xylol, methylethyleketon or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

2.04 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.

2.05 MIXES

.1 Mixing ratios in accordance with manufacturer's written instructions.

3 EXECUTION

3.01 PREPARATION OF JOINT SURFACES

.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 in materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer’s directions.

3.02 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

3.03 BACK UP 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

3.04 MIXING

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

3.05 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instruction.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.2 Apply sealant in continuous beads.

.3 Apply sealant using gun with proper size nozzle.

.4 Use sufficient pressure to fill voids and joints solid.

.5 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.6 Tool exposed surfaces before skinning begins to give slightly concave shape.

.7 Remove excess compound promptly as work progresses and upon completion.

.8 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.9 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

1 GENERAL

1.01 WORK INCLUDED

.1 This section of work shall include all labour, materials, tools, scaffolds and other equipment, services and supervision required to prepare surfaces and to cover them with paint as herein specified and as shown on the drawings, to the full intent of the specifications.

1.02 WORK EXCLUDED

.1 Steel Fabrications: refer to Section 09 96 00 – High Performance Coatings.

.2 All factory and pre-finished items not scheduled and specified for painting.

1.03 RELATED SECTIONS

.1 Section 03 30 00 – Cast-in-Place Concrete

.2 Section 32 16 15 – Concrete Walks, Curb and Gutters

1.04 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 Safety Data Sheets (SDS).

.3 National Fire Code of Canada.

.4 The Master Painters Institute (MPI) Maintenance Repainting and Architectural Painting Specification Manuals, current edition.

.5 Society for Protective Coatings (SSPC)

.1 Systems and Specifications, SSPC Painting Manual 2011

1.05 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.

.2 If requested by the Departmental Representative, provide for approval a 300 x 300 mm sample of each colour on the actual base material. Colours shall be exact shade, texture and gloss value.

.3 All colours shall be as selected by Departmental Representative.

1.06 QUALITY ASSURANCE

.1 The paint products of the Paint Manufacturer shall be as listed in the MPI Architectural Painting Specification Manuals (latest edition), under “Paint Product Recommendation” section, or approved equivalent.

.2 This contractor shall have a minimum of five (5) years proven satisfactory experience and shall maintain a qualified crew of painters throughout duration of the work who shall be qualified to fully satisfy the requirements of this specification. Only qualified journeymen (and apprentices) shall be engaged in painting and decorating work who have a provincial Tradesman Qualification certificate of proficiency.

.3 This work section requires full cooperation at all times with the MPDA (MPI) in the performance of its duties.

1.07 PRODUCT HANDLING

.1 Paint materials shall be delivered to the job site in sealed original labeled containers bearing manufacturer’s name, type of paint, brand name, designation, and instruction for mixing and/or reducing.

.2 The Contractor shall provide adequate storage facilities. Paint materials shall be stored at a minimum ambient temperature of 7°C in a well ventilated and heated single designated area.

.3 Take all necessary precautionary measures to prevent fire hazards and spontaneous combustion.

.4 Where toxic materials and both toxic and flammable solvents are used, appropriate precautions shall be taken and no smoking allowed as a regular procedure.

1.08 ENVIRONMENTAL CONDITIONS

.1 Temperature, humidity and moisture content shall conform to the following:

Temperature:	No painting shall be performed when temperature on the surfaces, or the air in the vicinity of the painting work are below 5°C (41°F) for interior work and 10°C (50°F) for exterior work.
Relative Humidity:	Shall not be higher than 85%.
Moisture of Surfaces:	Tests shall be done by electronic “Moisture Meter”.
Masonry/Concrete:	Maximum moisture content 12% for solvent type paint.

1.09 PROTECTION

.1 Adequately protect other surfaces from paint and damage and make good any damage caused by failure to provide suitable protection, but this section will not be responsible for any damage caused by others.

.2 Furnish sufficient drop cloths, shields and protective equipment to prevent spray of dropping from fouling surfaces not being painted and in particular, surfaces within the storage and preparation area.

.3 Cotton waste, cloths and material, which may constitute a fire hazard, shall be placed in closed metal containers and removed daily from the site.

.4 Remove all surface hardware, electrical plates, fittings, fastenings, etc. prior to painting operation. These items shall be carefully stored, cleaned and replaced on completion of work in each area.

1.10 SCHEDULING

.1 Schedule painting operations to prevent disruption of and by other trades.

1.11 INSPECTION AND GUARANTEE

.1 Upon completion of the work, provide a Master Painter’s and Decorator’s Association two (2) year guarantee, or alternatively a 2 year maintenance bond to the full value of the painting subcontract, both in accordance with the MPI painting manual requirements.

.2 During work, an inspector acceptable to the Departmental Representative shall inspect work for compliance with specifications and standards of the MPI, whether using the MPI guarantee or the maintenance bond option.

.3 Provide regular inspection reports to the Departmental Representative.

.4 The cost of the inspection and guarantee shall be included in the work of this Section.

.5 If the maintenance bond option is used, provide a letter of consent from a surety licensed to do business in Canada prior to award of the painting contract.

2 PRODUCTS

2.01 MATERIALS

.1 Paint, varnish, stain, enamel, lacquer, and fillers used shall be of a type and brand herein specified and listed under “Paint Product Recommendations” as covered in the MPI Architectural Painting Specification Manuals, latest edition, for specific purposes.

.2 Paint materials such as linseed oil, shellac, turpentine, etc. and any of the above materials not specifically mentioned herein but required for first class work with the finish specified shall be of the highest quality product of an approved manufacturer. All coating material shall be compatible.

.3 All materials shall be lead, hex. chromium, cadmium and mercury free and shall have low VOC content. No VOC content for paint employed on drywall surfaces.

.4 Preference should be given to ISO 2002 registered manufacturers.

.5 Only qualified products with E2 “Environmentally Friendly” rating are acceptable for use on this project. Provide paint products meeting MPI “Environmentally Friendly” E2 ratings based on VOC (EPA Method 24) content levels. Use MPI listed materials having minimum rating where indoor air quality (odour) requirements exist.

.6 All material shall be premium Architectural grade unless otherwise specified.

.7 Where required, paints and coatings shall meet the flame spread requirements of local authorities having jurisdiction.

2.02 GLOSS

.1 Paint gloss is defined as the sheen rating of applied paint, in accordance with the following values:

.1 Gloss Level 1: Flat or matt: max. 5 units @ 60 degrees to a maximum of 10 units @ 85 degrees.

.2 Gloss Level 2: High Sheen Flat (Velvet-like): max. 10 units @ 60 degrees to a maximum of 10 – 35 units @ 85 degrees.

.3 Gloss Level 3: Eggshell: max. 10 – 25 units @ 60 degrees to a maximum of 10 – 35 units @ 85 degrees.

.4 Gloss Level 4: Satin-like Finish: max. 20 – 35 units @ 60 degrees to a minimum of 35 units @ 85 degrees.

.5 Gloss Level 5: Semi-gloss Finish: max. 35 – 70 units @ 60 degrees.

.6 Gloss Level 6: Gloss Finish: max. 70 – 85 units @ 60 degrees.

.7 Gloss Level 7: High Gloss Finish: more than 85 units @ 60 degrees.

3 EXECUTION

3.01 GENERAL

.1 Method of paint application shall be generally by the accepted trade method. Painting coats specified are intended to cover surfaces satisfactorily when applied in strict accordance with recommendations.

.2 Apply each coat at the proper consistency. Each coat of paint shall be slightly darker than preceding coat unless otherwise approved.

.3 Application of paint shall be in strict accordance with MPI Architectural Painting Specification Manual requirements.

.4 Complete hiding is required on all finishes, including deep tone colours.

.5 Contractor shall employ sufficient tradesmen to carry out the job with no interruption, slow down or inconvenience to the project schedule and operations.

3.02 CONDITION OF THE SURFACES

.1 Prior to commencement of work of this section, thoroughly examine all surfaces scheduled to be painted.

.2 Report to Departmental Representative any condition adversely affecting this work.

.3 No painting work shall proceed until all defects have been corrected and surfaces are acceptable for painting.

.4 Commencement of work shall be held to imply acceptance of surfaces.

.5 All preparation work shall be the responsibility of this section. (Refer to Surface Preparation).

3.03 PREPARATION OF SURFACES

.1 Prior to commencement of work of this section, thoroughly examine all surfaces scheduled to be painted. Report to Departmental Representative any conditions adversely affecting this work. Prepare all interior surfaces for repainting in accordance with MPI Manual requirements.

.2 No painting work shall proceed until all defects have been corrected and surfaces are acceptable for painting. All preparation work shall be the responsibility of this Section.

.3 Prepare all surfaces in accordance with the requirements in Chapter 3 of the MPI Architectural Painting Specification Manuals (latest edition) and as herein specified.

.4 Where severely contaminated with grease, smoke and tar – hand wash with detergent and rinse thoroughly prior to any surface preparation.

.5 All surfaces: applications shall be by brush/roller.

.6 Allow full drying between coats, as per manufacturer's recommendations.

.7 Ensure that a transition primer is applied over alkyd surfaces where waterborne systems have been specified.

3.04 FIELD QUALITY CONTROL

.1 In strict accordance with the MPI Architectural Painting Specifications Manuals requirements.

3.05 PAINTING SCHEDULE

.1 The following titles, grades and code numbers refer to those listed in the Master Painters Institute (MPI) Architectural Painting Specifications Manual, latest edition.

.2 Existing Exterior Systems: (Refer to Chapter 2, MPI Manual).

.1 Asphalt Traffic/Zone Marking
EXT 2.1B alkyd zone/traffic marking

.2 Concrete Surfaces (Premium Grade) EXT
3.1A latex finish, (level 2 sheen)

3.06 PAINT COLOUR

.1 To match existing.

3.07 ADJUST AND CLEAN

.1 On completion of the work, remove all paint where spilled, splashed or splattered.

.2 During the progress of the work, keep the premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.

.3 At the conclusion of the work leave the premises neat and clean to the satisfaction of the Departmental Representative.

3.08 FIELD QUALITY CONTROL

.1 Painting surfaces will be considered to lack uniformity and soundness if any of the following defects are apparent:

.1 Runs, sags, hiding or shadowing by inefficient application methods.

.2 Evidence of poor coverage at lap joints, crevices, pockets, corners and re-entrant angles.

.3 Damage due to touching before paint is sufficiently dry or any other contributory cause.

.4 Damage due to contamination of paint due to airborne particles.

3.09 PROTECTION

.1 Protect all newly painted exterior surfaces from rain and snow, condensation, contamination, dust, salt spray and freezing temperatures until paint coatings are completely dry. Curing periods shall exceed the manufacturer's recommended minimum time requirements.

.2 Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

3.10 CLEANING

.1 Promptly as the work proceeds and on completion of the work, remove all paint where spilled, splashed or spattered using methods that are not detrimental to affected surfaces.

.2 Keep the premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.

.3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

.4 Clean equipment and dispose of wash water/solvents as well as all other cleaning and protective materials (ie. Rags, drop cloths, masking papers) paints, thinners paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction.

.5 At the conclusion of the work, leave the premises neat and clean.

END OF SECTION

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1 GENERAL

1.01 DESCRIPTION

.1 High-performance coating to steel includes for SP-6 surface preparation, 1 coat polyurethane primer encapsulation (2 applications) and 1 coat aliphatic polyurethane enamel (2 applications) of steel:

.1 Structural steel including columns, purlins, beams, members, braces, rods, plates.

.2 Steel 'C' channel welded to steel column to protect electrical outlet.

1.02 RELATED SECTIONS

.1 Section 05 12 23 - Structural Steel for Buildings

.2 Section 05 50 00 – Metal Fabrications

1.03 REFERENCES

.1 American Society for Testing and Materials International (ASTM):

.1 ASTM B 117-11, Standard Practice for Operating Salt Spray (Fog) Apparatus.

.2 ASTM C 411-11, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.3 ASTM D 522/D522M-13- Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.

.4 ASTM D 610-08(2012), Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces.

.5 ASTM D 714-02(2009) - Standard Test Method for Evaluating Degree of Blistering of Paints.

.6 ASTM D 1475-13, Standard Test Method For Density of Liquid Coatings, Inks, and Related Products.

.7 ASTM D 1653-13, Standard Test Methods for Water Vapor Transmission of Organic Coating Films.

.8 ASTM D 2369-10(2015)e1, Standard Test Method for Volatile Content of Coatings.

.9 ASTM D 2486-06(2016), Standard Test Methods for Scrub Resistance of Wall Paints.

.10 ASTM D 2794-93(2010) - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

.11 ASTM D 3273-16, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

.12 ASTM D 3274-09(2013), Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt. Accumulation.

.13 ASTM D 3359-09e2, Standard Test Methods for Measuring Adhesion by Tape Test.

.14 ASTM D 3960-05(2013), Standard Practice for Determining Volatile Organic Compound (VOC)Content of Paints and Related Coatings.

.15 ASTM D 4017-02(2015), Standard Test Method for Water in Paints and Paint Materials by Karl Fischer Method.

.16 ASTM D 4060-14 - Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

.17 ASTM D 4414-95(2013), Standard Practice for Measurement of Wet Film Thickness by Notch Gages.

.18 ASTM D 4541-09e1, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

.19 ASTM D 5894-10, Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet).

.20 ASTM D6904-03(2013), Standard Practice for Resistance to Wind-Driven Rain for Exterior Coatings Applied on Masonry.

.21 ASTM D7088-08, Standard Practice for Resistance to Hydrostatic Pressure for Coatings Used in Below Grade Applications Applied to Masonry.

.22 ASTM D 7091-13, Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals (SSPC-PA 2).

.23 ASTM E 84-16, Standard Test Method for Surface Burning Characteristics of Building Materials.

.24 ASTM E 96 / E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.

.25 ASTM E 108-17, Standard Test Methods for Fire Tests of Roof Coverings.

.26 ASTM E 903-12, Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.

.27 ASTM G 85-11, Standard Practice for Modified Salt Spray (Fog) Testing.

.2 Occupational Safety and Health Administration (OSHA):

.1 OSHA 29 CFR, Part 1910 – Occupational Safety and Health Standards.

.2 OSHA 29 CFR 1926 – Safety and Health Regulations for Construction.

.3 Society for Protective Coatings (SSPC):

.1 SP-1, 2015 - Solvent Cleaning.

.2 SP-6, 2004 – Blasting.

.3 VIS 3, 2002 - Visual Standard for Power and Hand Tool Cleaned Steel.

.4 SSPC-PA 1, 2004, Shop, Field and Maintenance Painting of Steel.

.5 SSPC-PA 2, 2015 – Procedure for Determining Conformance to Dry Coating Thickness Requirements.

.6 SSPC-Guide 6, 2015 – Guide for Containing Surface Preparation Debris Generated during Paint Removal Operations.

.7 SSPC-Guide 6, 2015 – Guide for Containing Debris Generated during Paint Removal Operations.

1.04 DEFINITIONS

.1 The following definitions shall apply in this standard:

.1 Coatings: Liquid, powder, or mastic composition that has been converted to a solid, durable, and functional adherent film after application as a thin layer.

.2 Contractor: The party that furnishes the work and materials for placement or installation.

.3 Manufacturer: The party that manufactures, fabricates, or produces materials or products.

1.05 SUBMITTALS

.1 Submit details of proposed work procedures. These details shall clearly describe the equipment and methods used for surface preparation work, masking and hoarding, and coating material application. At least 8 days prior to commencement of production work, the Contractor shall submit details outlining procedures for product handling, spill contingency plans, and response procedures in the event solvent, paint, or other material spills on property.

.2 Provide all necessary documentation as requested by Departmental Representative to meet performance requirements of this specification. Information shall include, but not limited to the following:

.1 Samples: duplicate samples of colour and sheen.

.1 Submit samples on rigid backing, 200 mm square.

.2 Step coats on samples to show each coat required for system.

.3 Label each coat of each sample.

.4 Label each sample for location and application area.

.2 Product Data:

.1 Materials list of items proposed to be provided.

.2 Manufacturer's Product Data Sheet.

.3 Safety Data Sheets (SDS).

.3 Closeout Submittals: in accordance with Section 01 78 00 - Closeout Submittals.

.1 Warranty:

.1 Provide applicators five (5) year complete warranty for replacement of materials and application.

.1 Warranty is in addition to, and not a limitation of, other rights under Contract Documents.

.2 Operating and Maintenance:

.1 Submit operating and maintenance data for incorporation into manual and include following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.3 Colour numbers and applied locations.

.3 Maintenance Materials:

.1 Package unopened extra products with protective covering and identify with descriptive labels.

.2 Deliver to Departmental Representative, upon completion of the work of this section and store where directed.

1.06 QUALITY ASSURANCE

.1 Quality assurance inspections will be completed by Independent Inspector as appointed by the Departmental Representative to verify that coatings have been applied in accordance with the manufacturer's instructions and applicable standards.

.2 Be responsible for quality control for all aspects of surface preparation and coatings application. Manufacturer to provide quality assurance inspections to verify that coatings have been applied in accordance with the manufacturer's instructions and applicable standards.

.3 Qualifications:

.1 Manufacturer: to have a minimum of five (5) years' experience in the manufacturing of and providing technical service for protective coating systems equivalent to those specified herein.

.1 Single source supply: all products shall be manufactured or approved by use by manufacturer of the system specified herein.

.2 Contractor and Applicators: certified applicator by manufacturer and to have minimum of five (5) years' proven satisfactory experience. Provide list of last three (3) comparable jobs including, job name and location, specifying authority, and project manager.

1.07 DELIVERY, STORAGE AND HANDLING

.1 Materials and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.

.1 Transportation/Delivery

.1 Delivery shall be pre-arranged by Contractor with coating manufacturer, allowing a minimum of two weeks before application of coating is to begin.

.2 Material shall be delivered in the original, factory sealed and unopened containers that include all identifying markings, including labels and batch numbers and date, colour number, affixed to all packaging.

.3 Examination and unloading of delivered materials is the sole responsibility of the Contractor.

.2 Storage and Protection

.1 Provide suitable temporary weather tight storage facilities as may be required for materials that will otherwise be damaged by storage in the open.

.2 Store materials between 70 degrees F (21 degrees C) and 100 degrees F (38 degrees C) in dry, shaded conditions away from sources of heat and ignitions - protect from freezing. Store and protect materials delivered at the site from damage.

.3 Maintain SDS reports on all stored materials at project site, make accessible to employees.

.4 Keep materials sealed until ready for use.

.5 Do not use materials that exceed manufacturer's stated shelf life.

.3 Handling

.1 Protect materials during handling and application to prevent damage or contamination.

.2 Refer to manufacturers SDS sheet for proper safety equipment.

.4 Waste Management and Disposal

.1 The Contractor shall be responsible for clean-up, testing and documentation of all spent abrasives, blasting and general debris generated at project site.

.2 Submit to Departmental Representative advanced notification of their proposed plan for storing, handling, and disposal of waste materials at the project site.

.3 Job site shall be maintained in a reasonably neat and orderly condition and kept free from accumulations of waste materials and rubbish during the entire construction period.

.4 Remove crates, cartons, and other flammable waste materials or trash from the work areas at the end of each working day.

.5 All hazardous materials must be disposed of in an approved manner as stated in the "Workers' Compensation Board" reference manual "WHMIS Core Material" and as laid out in the "Occupational Health and Safety Regulations".

1.08 PROJECT/SITE/SHOP CONDITIONS

.1 This section is directed toward the environmental control of the coating application area.

.2 Steel fabrications are to be shop painted, with touchup onsite after installation.

.3 Heating and Ventilation:

.1 Ventilate enclosed spaces:

.1 Provide temporary ventilating and heating equipment.

.2 Do not perform painting work unless adequate and continuous climatic control and ventilation facilities are in place to maintain ambient air and substrate temperatures in accordance with manufacturer's written instructions before, during and after paint application until coating has cured sufficiently.

.3 Where required, provide continuous ventilation for seven days after completion of application of coating.

.4 Lighting: 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 Contractor.

.5 Environmental Conditions:

.1 Do not apply coatings when relative humidity exceeds 85%.

.2 The surface temperatures for steel shall be at a minimum of 5 degrees C above the dew point during all phases of surface preparation and coating applications.

.3 Do not apply coatings to damp or wet surfaces or in snow, rain, fog or mist.

.6 Protection of Work

.1 Work shall be scheduled as to avoid excessive dust and other airborne deleterious contaminants, during both application and curing of coatings.

.2 Work area shall be protected from deleterious contaminants.

.3 Care shall be taken by workmen not to mark, soil, or otherwise deface finished surfaces. In the event finished surfaces become defaced, clean and restore such surface to their original conditions at no additional cost to the Departmental Representative.

2 PRODUCTS

2.01 DESCRIPTION

.1 The protective coating system shall consist of one or more products for corrosion protection. The protective coating system shall consist of a penetrating polyurethane primer and aliphatic polyurethane enamel for the steel substrates.

.2 Coating system shall be supplied by one manufacturer.

2.02 MATERIALS

.1 Materials for Steel Coating:

.1 Primer: one-part metallic filled moisture-cured, penetrating polyurethane.

.1 Performance characteristics:

.1 Salt fog resistance: 15,000 hours to ASTM B 117, D 714 and D 610.

.2 High temperature surface performance: no warping, cracking, delaminating or colour change to ASTM C 411.

.3 Flexibility: to ASTM D 522.

.4 Water vapour transmission: to ASTM D 1653.

.5 Weathering: 100 hours to ASTM D 2369, D 4017, D 3960 and D 1475.

.6 Scrub resistance: to ASTM D 2486.

.7 Impact Resistance: to ASTM D 2794.

.8 Mildew resistance: to ASTM D 3273 / D 3274.

.9 Adhesion and penetration: 18 layers to ASTM D 3359.

.10 Abrasion resistance: .06g loss to ASTM D 4060 (encapsulating primer).

.11 Pull-off adhesion: 1467 psi to ASTM D 4541.

.12 Cyclic salt fog/UV exposure: to ASTM D 5894.

.13 Resistance to wind driven rain for exterior coatings: to ASTM D 6904.

.14 Resistance to hydrostatic pressure for coatings: to ASTM D 7088.

.15 Surface burning characteristics: to ASTM E 84.

.16 Flame Spread: to ASTM E 108.

.17 Solar reflectance: 44.6% to ASTM E 903.

.18 Solar absorption: 55.5% to ASTM E 903.

.19 Prohesion over rusted metal: to ASTM G 85.

.20 Thickness: as indicated on Schedule of High Performance Coating System

.21 Colour: metallic grey.

.2 Acceptable product: Rust Grip by Superior Products International or pre-approved alternative.

.2 Finish Coat: two-part aliphatic polyurethane enamel.

.1 Performance characteristics:

.1 Salt fog resistance: 2000 hours to ASTM B 117.

.2 Gloss Retention: to ASTM D 523.

.3 Abrasion resistance: .11.8mg loss to ASTM D 4060.

.4 Cyclic salt fog/UV exposure: 5000 hours to ASTM D 5894.

.5 Resistance to wind driven rain for exterior coatings: to ASTM D6904.

.6 Resistance to hydrostatic pressure for coatings: to ASTM D 7088.

.7 Surface burning characteristics: to ASTM E 84.

.8 Water vapour transmission: -0.6809 to ASTM E 96.

.9 Thickness: as indicated on Schedule of High Performance Coating System

.10 Colour: to match existing.

.2 Acceptable product: Enamo Grip by Superior Products International or pre-approved alternative.

2.03 MIXES

.1 Mix complete unit in proportions supplied. Once a unit has been mixed it must be used within the pot life as specified by the manufacturer. Mixing and thinning of materials shall be in accordance with manufacturers written instructions.

3 EXECUTION

3.01 EXAMINATION

.1 Substrates to receive coatings must be sound, proper, and free of defects.

.2 All surface preparation and coating applications shall be inspected by Independent Inspector and meet performance requirements of specification prior to proceeding to next step in operation.

.3 Submit to Departmental Representative and manufacturer quality control records detailing the work completed, surface preparation methods, ambient air temperature, relative humidity, structure surface temperature and dew point, coatings used with batch numbers, coating thickness, application method, etc. on inspection sheets as provided by Departmental Representative.

.4 All conditions that would interfere with performance of coating system, must be reported to Departmental Representative and manufacturer’s representative in writing and corrected before continuing with specified Work.

3.02 PREPARATION

.1 Prepare surfaces in accordance with the criteria below in order to achieve the life expectancy of the specified coating system:

.1 All surface preparation and cleaning procedures utilized shall be in strict accordance with the paint manufacturer's recommendations as approved by manufacturer and manufacturer’s representative.

.2 Supply all necessary air compressors, and all other tools required to carry out the accepted work efficiently.

.3 Remove existing items not scheduled to receive paint; or provide surface applied protection prior to surface preparation and painting operations.

.4 Clean each surface to be painted prior to applying paint or surface treatment.

.5 Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 93 degrees C, prior to start of mechanical cleaning. The use of an emulsifying degreaser is acceptable. Paint only clean dry, properly prepared surfaces.

.6 Schedule the cleaning and painting so that dust, paint overspray, and other contaminants from the cleaning process will not fall onto wet newly painted surfaces.

.7 Cover or plug all piping and appurtenances to prevent grit, sand or other sand blasting debris, paint and overspray from entering.

.8 Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.

.2 Prepare surfaces by:

.1 Removing all forms of surface contamination, especially oil and moisture.

.2 Removing weld spatter and slivers.

.3 Repairing all holes or pits greater than 3mm. Contractor to notify Departmental Representative for repair procedures.

.4 Remove or grind down all sharp burrs, edges, and weld spatter from all steel that is to be coated

.5 The maximum allowable residual salt contamination, as measured with a KTA Scat Kit or equivalent field test method, immediately prior to the application of the first coat is as follows:

.1 Eight (8) micrograms per square centimeter (80mg/m2) for atmospheric conditions.

.6 Following all applicable safety standards.

.7 Call for independent and manufacturer’s representative inspection of surface prior to coating application.

.3 Prepare surfaces in accordance with the following method sequence:

.1 SSPC-SP1 Solvent Cleaning:

.1 Removal of all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces with solvent, vapor, cleaning compound, alkali, emulsifying agent, or steam.

.2 SSPC-SP6 Commercial Blast Cleaning:

.1 Power tool cleaning removes all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered adherent if they cannot be removed by lifting with a dull putty knife.

.3 SSPC-SP1 Solvent Cleaning:

.1 After Commercial Blast Cleaning, perform SSPC-SP1 Solvent Cleaning to remove any remaining visible contaminants before applying the prime coat.

3.03 APPLICATION

.1 Apply high-performance coatings according to manufacturer's written instructions (cross-hatch method) and in accordance with SSPC PA 1 Shop, Field, and Maintenance Painting of Steel.

.1 Before painting:

.1 Surfaces must be free of chlorides. Assess and treat in accordance with manufacturer's written instructions.

.2 Surfaces must be completely dry before applying coating product.

.2 Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections.

.3 Adhere to the following recommendations when applying paint:

.1 A coating is not to be pushed beyond its limitations, or be substituted for what is available over what is recommended.

.2 Guidelines for product storage and usage must be adhered to. Failure to do so could result in surface anomalies, dry spray, poor film formation, poor adhesion, and premature coating failure.

.3 Use of brush and roller application typically gives reduced dry film thickness and can require multiple coats to achieve the specified dry film thickness. Airless spray equipment and tips in accordance with manufacturer's recommendations.

.4 Film thickness is to be uniform, applied at the recommended film thickness per coat, and free of surface imperfections, such as run, sags, holidays, or overspray.

.5 Coatings must be allowed to cure before being recoated or placed into service. Drying time requirements recommended by the manufacturer must be followed exactly.

.4 After each coating, measure coating thickness with calibrated Nordson Microtest Dry Film Thickness Gauge or equivalent. The Contractor shall provide additional coats at no extra cost to meet required DFT thickness.

3.04 REPAIR AND RESTORATION

.1 Check locations for paint which has peeled, bubbled, or cracked and undertake testing for adhesion generally in accordance with ASTM D-3359 Method A or B (ISO 2409) Adhesion by Cross-Cut Tape Test and Cross Hatch respectively. Visible (rust grade10 per ASTM D610, ISO 4628 Part 3), will be considered a failure of the paint system.

.2 Repairs where failure observed by preparing the area back to clean substrate, and re-coating with the specified coating system to meet the minimum levels of performance set forth for this project.

.3 Repairs shall be conducted at no cost.

3.05 REAPPLICATION

.1 Repair damage to shop applied coatings occurring in storage, erection or installation to standards equal to the project specifications and in accordance with the following:

.1 Immediately prior to repairing damaged or unpainted surfaces, and before the specified surface preparation is carried out remove, all grease, oil, dirt, and foreign matter as per SSPC-SP1.

.2 Edges of sound remaining coating on the surface shall be feathered by sanding/grinding prior to painting.

.3 Gloss paint surfaces shall be sanded or abraded to provide a bond for successive coats.

.2 The minimum coating requirements for spot coating repairs shall be as follows:

.1 Exposed Primer (no corrosion): apply one or more finish coats to restore specified film thickness.

.2 Primer Damage (no corrosion): clean area to substrate and reapply the specified system.

.3 Corroded Areas: after cleaning to the original standard of surface cleanliness, reapply specified system.

.4 Areas to be repaired to be inspected by the coating inspector before, during and after such repairs to confirm compliance with the foregoing and /or the project specifications.

3.06 QUALITY CONTROL

.1 Unless otherwise notified by the Departmental Representative in writing, Independent Inspector shall be responsible for inspection and quality control coating work, in compliance with standards and procedures established in this specification.

.2 Work specified under this contract is subject to inspection at any time by Independent Inspector implementing the Departmental Representative's quality assurance program.

.3 Allow Independent Inspector to continuously inspect the work and prepare daily inspection and progress reports. All reports shall be submitted to Departmental Representative.

.4 Inspector shall clearly define on the inspection reports the areas inspected. The inspection reports shall be written so that they clearly relate to identifiable surfaces (i.e., structural steel member locations).

.5 If test results indicate noncompliance with the specification, the following corrective action will be required of the Contractor:

.1 Removal of non-compliant systems or components.

.2 Replacing system or components.

.3 Responsible for re-testing/inspection costs.

.6 Inspect all clean surfaces prior to application of coating in accordance with the following tests and procedures:

.1 Pre-surface preparation inspection.

.2 Measurement of Environmental Conditions such as Surface Temperature, Relative Humidity, Dew Points.

.3 Evaluation of Compressor and Surface Preparation Equipment.

.4 Determination of Surface Preparation Cleanliness and Surface Profile.

.5 Inspection of Application Equipment.

.6 Witnessing Coating Mixing.

.7 Record batch numbers and solvents used.

.8 Measure Wet Film Thickness.

.9 Measure Dry Film Thickness to SSPC PA2 Standard Method.

.10 Evaluating Cleanliness between Coats.

.11 Photos records of surface preparation and individual coats should accompany written reports.

.7 Manufacturer's representative will also inspect project during work, at completion and within 6 months of completion for coating failures and deficiencies. Contractor to complete all deficiencies as soon in accordance with weather permitting within first year warranty period.

3.07 ADJUSTING

.1 Adjustments may be made to equipment and operating environment to assure that it is suitable for optimum conditions pertaining to surface preparation and application of coating systems specified herein.

3.08 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.

3.09 PROTECTION

.3 Protect newly painted surfaces from rain, condensation, contamination, snow and freezing temperatures until the paint is thoroughly dry. Curing periods shall exceed the manufacturer's recommendations.

3.10 SCHEDULE OF HIGH PERFORMANCE COATING SYSTEM

.1 Structural Steel (members, beams, braces, purlins, rods, columns, plates, angles):

.1 Surface preparation and sequence.

.1 All surfaces to be assessed and treated in accordance with SSPC-SP-1 Solvent Cleaning followed by SSPC-SP-6 Commercial Blast Cleaning, followed by final SSPC-SP-1 Solvent Cleaning.

.2 A sharp, angular surface profile of 2-3 mils (50-75 microns) is recommended.

.3 Stripe coat to be applied to all welds, lap joints, plate edges, corners, sharp edges and any other areas where spray application of the overall coating system may prove difficult resulting in low dry film thickness.

#	Coat Type	Product	DFT (microns)
1	Full Coat – 1st	One-part polyurethane, metallic-pigmented, moisture cured.	51
	Stripe Coat	One-part polyurethane, metallic-pigmented, moisture cured.	51
	Full Coat – 2nd	One-part polyurethane, metallic-pigmented, moisture cured.	51
2	Full Coat – 1st	Two-part solvent based polyurethane enamel.	49
	Full Coat – 2nd	Two-part solvent based polyurethane enamel.	49
	Total		251

3.11 RESTORATION

.1 Clean and reinstall items temporarily removed to allow work to be completed.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible cleaner. Do not damage adjacent finished surfaces.

.4 Protect freshly completed surfaces from coat droppings and dust to approval of Departmental Representative.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

.6 Reinstall all components to original details where temporarily removed during work.

END OF SECTION

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1 GENERAL

1.01 WORK INCLUDED

.1 Supply & install standard CBSA exterior signage as listed on appended Exterior Signage Planning Aid Appendix at end of section.

1.02 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00.

.2 Shop Drawings:

.1 Submit shop drawings for work of this section.

.2 Identify and describe material types being supplied, wall thicknesses of extrusions, and shapes including all connections and grades, attachments, reinforcing, anchorage and locations of fastenings, and provisions for thermal and structural movement between components of work of this section and adjacent materials.

.3 Include description of materials, finishing specifications, and all other pertinent information.

.4 Clearly indicate fabrication details, plans, elevations, hardware, and installation details.

.5 Digital proofs:

.1 Submit one complete set of colour digital proofs showing placement and typography of final graphic components and images.

.2 Proofs shall show final text and images, in place, scaled to accurately assess type spacing, overlay text on images, illustrations and graphic effects such as bleeds, graded colour, etc.

.3 Samples:

.1 Submit 3 – 305 x 305 mm samples, each fastener type and finish specified.

.4 Product Data Sheets:

.1 Submit manufacturer's product data sheets for Products proposed for use in the work of this section.

.2 Submit manufacturers' installation instructions.

.5 Templates:

.1 Submit templates to Contractor for use by installers and fabricators as required for proper location and installation of signage.

.6 Closeout Submittals:

.1 Submit closeout submittals in accordance with Section 01 78 00.

.2 Operation and maintenance data:

.1 Submit operation and maintenance data instructions for signage and finishes.

1.03 DELIVERY, STORAGE, AND HANDLING

.1 Package or crate, and brace and wrap Products to prevent damage during shipment and handling. Label packages and crates according to signage numbers as listed in the signage schedule, and protect finish surfaces from environmental conditions where required.

.2 Deliver Products to location at building site designated by Contractor.

.3 Provide methods for lifting or hoisting units into place without causing damage.

2 PRODUCTS

2.01 NOMINATED SUPPLIER

.1 As Canada has an agreement with the Pattison Sign Group (604-215-5526), all building signage shall be provided by said company.

2.02 MATERIALS

.1 Exterior sign system:

.1 To match existing.

.2 Refer to Exterior Signage Planning Aid appended to this Section, referencing '*Return to USA*' signage.

2.03 FABRICATIONS

.1 General: Produce smooth, even, level sign panel surfaces, constructed to remain flat when installed within a tolerance of +1.5 mm measured diagonally from corner to corner.

.2 Laminated sign panels where utilized: Permanently laminate face panels to backing sheets, of material and thickness indicated, using manufacturer's standard process.

.3 Copy application:

.1 Edges of letters, numbers or symbols shall be smooth with corners sharp and true.

.2 Forms shall be free of ticks, line waver, discontinuous curves and other imperfections.

.3 Submit samples of the range of colours and fonts available for signage for approval.

.4 Minimum font size shall be 18 mm.

2.04 ACRYLIC SIGNS

.1 Surface and subsurface silkscreened acrylic signs:

.1 Silkscreen copy shall be photo-produced rather than hand cut seams using fine mesh screens and screening inks.

.2 Surface of letters shall be uniform in colour and finish and free of pinholes or other blemishes.

.3 Signs shall be consistent in colour, value and coverage, and shall maintain proper opacity or translucency and shall be free of blistering, fading and other imperfections.

.4 Sign colour registration shall be crisp, sharp and free of imperfections.

3 EXECUTION

3.01 INSTALLATION

.1 Examine surfaces to which signage is to be anchored and report any unacceptable conditions. Commence work only after surfaces are acceptable.

.2 Install in accordance with signage manufacturer's specifications and templates as required for installation of work of this section.

.3 Install signage level and secure at locations indicated.

.4 Install on painted steel hss posts, sized and shop painted to match existing exterior freestanding posts, complete with welded steel base plates to bolt to concrete base.

3.02 ADJUSTMENT AND CLEANING

.1 Verify under work of this section that installed Products function properly, and adjust them accordingly to ensure satisfactory operation.

.2 Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at site only if acceptable.

.3 Remove excess materials from the site.

.4 Upon completion of the work of this section, or at such time or times as the Departmental Representative shall direct, remove protective coverings and clean down the finished work.

.5 Clean adjacent surfaces which have been soiled or otherwise marred, in an acceptable manner, to completely remove evidence of material causing same.

Exterior Signage Planning Aid
Aldergrove POE

Prepared July 14 2014

Sign name	Sign code	Pattison code	Main Port Bldg	Commercial Bldg	Total Signs		Shown on plan	Comments
Federal Visibility and Identification								
Flag			1		1	x		On lawn south of Main Port
Canada Wordmark	1E01a		2	2	4	x		Mount higher & towards outer edge of bldgs.
Welcome to Canada	1E02a				1	x		On lawn with single sided-post mount
Customs Commercial Office	1E05a	HH-37424-23		1	1	x		At entrance to facility
Advance and Traffic Control								
Return to Canada	2E03a	HH-37424-2			3	x		Located at strategic points
Return to USA	2E03b				1	x		Located at strategic points
Trucks keep right pictoral	2S04b	HH-37242-6		1	1	x		Pre-PIL on entry to Commercial Lanes
Authorized persons only	3E32a	HH-37424-22			4			On doors/fences to controlled access areas
Video Surveillance	3E35a	HH-37424-7/B			2	x		Entry to facility
Pedestrian crossing	4E04a	HH-37424-9			2	x		At pedestrian crossings
Barrier marker	4S05a				1			At exit post PIL
Visitor Parking	4E06a	HH-37424-10			3	x		1 required to be one direction north; 1 the other south; 1 directional to the east
Employee parking only	4E07b				2	x		At designated parking areas
Government vehicle parking	4E08a	HH-37424-11			1	x		Near building entrance
Handicap parking	4E09a	HH-37424-12			3	x		At designated parking areas
PIL Signs								
On booths:								
Firearms	3E01a	HH-37424-14	5	2	7	x		I for each PIL booth
PIL Booth number	3E33a	HH-37424-15	5	2	7	x		In corner of PIL booth facing in-bound traffic
Bilingual Service (symbol or decal)	3E34a	HH-37424-16	5	2	7	x		At PIL booths and inside service counters
Stop Signs (pre-PIL and other)	4E01a	HH-37424-8	8	3	11	x		At Pre-PIL & where traffic control is required
Authorized persons only	3E32a	HH-37424-22	5	2	7			At PIL doors
On canopy:								
Canopy Height	3E25a	HH-37424-17	8	2	10	x		On overhead canopy above PIL and inspection bays
Lane numbers	3E33b	HH-37424-18	5	2	7	x		On canopy above lanes and bays
Operational - Exterior of Building								
Authorized persons only	3E32a	HH-37424-22	5	4	9	x		On doors to controlled access areas
Directionals	2E02be		1		1			
Hours of operation for Main Port	3E13bb		1		1	x		Near main door to facility

END OF SECTION

1 GENERAL

1.01 SECTION INCLUDES

.1 Materials and application of asphalt tack coat to an existing asphalt or concrete surface prior to asphalt paving.

1.02 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 00 – Special Procedures for Traffic Control.

.3 Section 32 12 16 – Asphalt Paving.

1.03 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D 140, Standard Practice for Sampling Bituminous Materials.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-16.2, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.04 QUALITY ASSURANCE

.1 Upon request by Departmental Representative, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this section.

.2 Provide access on tanker for Departmental Representative to sample asphalt material to be incorporated into work, in accordance with ASTM D140.

1.05 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with ASTM D 140.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused asphalt from landfill to facility capable of recycling materials.

2 PRODUCTS

2.01 MATERIAL

.1 Emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.

3 EXECUTION

3.01 APPLICATION

.1 Obtain Departmental Representative's approval of surface before applying asphalt tack coat.

.2 Apply asphalt tack coat only on clean and dry surface.

.3 Dilute asphalt emulsion with water at 1:1 ratio for application.

.1 Mix thoroughly by pumping or other method approved by Departmental Representative.

.4 Apply asphalt tack coat evenly to pavement surface at rate as required, but not to exceed 0.7 L/m² when diluted with water at 1:1 ratio.

.5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.

.6 Do not apply asphalt tack coat when air temperature is less than 5 degrees C or when rain is forecast within 2 hours of application.

.7 Apply asphalt tack coat only on unfrozen surface.

.8 Apply tack coat only to surfaces that are expected to be overlayed on same day.

.9 Asphalt tack oil is toxic to aquatic life. Provide extra caution near catch basins and storm drain inlets as all storm sewers in the worksite drain to an environmentally sensitive watercourse.

.10 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.

.11 Where traffic is to be maintained, treat no more than one half of width of surface in one application.

.12 Keep traffic off tacked areas until asphalt tack coat has set.

.13 Re-tack contaminated or disturbed areas as directed by Departmental Representative.

.14 Permit asphalt tack coat to set before placing asphalt pavement.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 01 33 01 – Submittal Procedures.

.2 Section 01 35 00 – Special Procedures for Traffic Control.

.3 Section 32 12 15 – Asphalt Tack Coats.

1.02 REFERENCES

.1 American Association of State Highway and Transportation Officials (AASHTO)

.1 AASHTO M320, Standard Specification for Performance Graded Asphalt Binder.

.2 AASHTO R29, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.

.3 AASHTO T245, Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.

.2 Asphalt Institute (AI)

.1 .1 AI MS2 Sixth Edition, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.

.3 American Society for Testing and Materials International, (ASTM)

.1 ASTM C 88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

.2 ASTM C 117, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C 123, Standard Test Method for Lightweight Particles in Aggregate.

.4 ASTM C 127, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.5 ASTM C 128, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.

.6 ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.7 ASTM C 136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.8 ASTM C 207, Standard Specification for Hydrated Lime for Masonry Purposes.

.9 ASTM D 995, Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

.10 ASTM D 2419, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.11 ASTM D 3203, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.12 ASTM D 4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1, Sieves Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2, Sieves Testing, Woven Wire, Metric.

.3 CAN/CGSB-16.3, Asphalt Cements for Road Purposes.

1.03 PRODUCT DATA

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

.2 Submit manufacturer's test data and certification that asphalt cement meets requirements of this Section.

.3 Submit asphalt concrete mix design and trial mix test results to Departmental Representative for review at least 4 weeks prior to beginning Work.

1.04 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Divert unused aggregate materials from landfill to facility capable of recycling materials.

.4 Divert unused asphalt from landfill to facility capable of recycling materials.

2 PRODUCTS

2.01 MATERIALS

.1 Asphalt cement to:

.1 ASTM D 5, Penetration of Bituminous Materials

.2 ASTM D 2171, Standard Test Method for Viscosity of Asphalts by Vacuum capillary Viscometer.

.2 Aggregates per following general requirements:

.1 Crushed stone or gravel consisting of hard, durable angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.2 Gradations: within limits specified when tested to ASTM C 136 and ASTM C 117.

.1 To match existing. Confirm with minimum two core samples within area to be repaired.

.3 Table – Asphalt Mix Aggregate Gradation Limits.

Sieve Size (mm)	Percentage Passing by Mass				
	Coarse Mix	Medium Mix		Fine Mix	Superpave
	37.5mm	19mm	16mm	12.5mm	12.5mm
37.5	100				
25.0	80-100				
19.0	60-92	100			100
16.0	-	-	100		-
12.5	50-85	84-95	90-100	100	90-100
9.5	40-80	73-90	73-90	90-100	
4.75	30-65	50-75	50-75	55-80	-
2.36	20-50	35-57	35-57	32-64	28-58
1.18	15-35	26-45	26-45	24-51	
0.600	8-30	18-34	18-34	17-40	
0.300	6-22	10-26	10-26	13-29	

0.15	3-15	6-17	6-17	8-18	-
0.075	1-7	3-7	3-7	4-10	2-10

.4 Coarse aggregate: aggregate retained on 4.75mm sieve and fine aggregate is aggregate passing 4.75mm sieve when tested to ASTM C 136.

.5 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75mm sieve and stockpile separately from coarse aggregate.

.6 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.7 Sand equivalent: ASTM D 2419 Min: 40.

.8 Magnesium Sulphate soundness: to ASTM C 88 Max% loss by mass after five cycles:

.1 Coarse aggregate: 15%.

.2 Fine aggregate: 18%.

.9 Los Angeles abrasion: Grading B, to ASTM C 131 Max % loss by mass:

.1 Coarse aggregate, upper course: 25%

.2 Coarse aggregate, lower course: 35%.

.10 Absorption: to ASTM C 127 Max % by mass:

.1 Coarse aggregate, upper course: 1.75%.

.2 Coarse aggregate, lower course: 2.00%.

.11 Loss by washing: to ASTM C 117 Max % passing 0.075 mm sieve:

.1 Coarse aggregate, upper course: 1.5

.2 Coarse aggregate, lower course: 2.0

.12 Flat and elongated particles: to ASTM D 4791, (with length to thickness ratio greater than 3): Max% by mass:

.1 Coarse aggregate, upper course: 10%.

.2 Coarse aggregate, lower course: 10%.

.13 Crushed fragments: at least 60% of particles by mass within each of following sieve designation ranges, to have at least 2 freshly fractured face. Material to be tested according to ASTM C 136 and ASTM C117. Determination of amount of fractured material will be in accordance with Ministry of Transportation and Highways' Specification I-11, Fracture Count for Coarse Aggregate, Method "B", which determines fractured faces by mass.

Passing		Retained on
25mm	To	12.5mm
12.5mm	To	4.75mm

.14 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

.3 Mineral filler:

.1 Finely ground particles of limestone, hydrated lime, Portland cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.

.2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed to improve mix properties.

.3 Mineral filler to be dry and free flowing when added to aggregate.

2.02 EQUIPMENT

.1 Cold milling equipment: the Contractor shall use equipment with automatic grade and slope controls, capable of cold milling existing asphalt pavement to an accurate depth of cut, profile and cross slope and shall be capable of loading the milled material directly into trucks.

.1 The cutting head of the cold milling machine shall be a minimum width of 1.9 metres.

.2 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.3 Rollers: sufficient number of type and weight to obtain specified density of compacted mix.

.4 Vibratory rollers:

.1 Minimum drum diameter: 1200mm.

.2 Maximum amplitude of vibration (machine setting): 0.5mm for lifts less than 40 mm thick.

.5 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:

.1 Boxes with tight metal bottoms.

.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.

.3 In cool weather or for long hauls, insulate entire contact area of each truck box.

.4 Use only trucks which can be weighed in single operation on scales supplied.

.6 Hand tools:

.1 Lutes or rakes with covered teeth for spreading and finishing operations.

.2 Tamping irons having mass not less than 12 kg and bearing area not exceeding 310 cm² for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental Representative may be used instead of tamping irons.

.3 Straight edges, 3.0m in length, to test finished surface.

2.03 MIX DESIGN

.1 Mix design:

.1 Class 1

.2 To match existing asphalt. Contractor to have two core samples to be taken from area to be repaired to assist in mix design.

.3 Provided by the Contractor (to be developed by testing laboratory) for approval by Departmental Representative.

.2 Design of mix: to Marshall method and production criteria below.

PROPERTY OF LABORATORY COMPACTED PAVING MIXTURE	PAVEMENT CLASS	
	1	2
Number of blows each face of test specimens	75	75

Minimum % Voids in Asphalt Mix Aggregate for 19mm Medium Asphalt Mix	14	14
Minimum % Voids in Asphalt Mix Aggregate for 16mm Medium Asphalt Mix	14.5	14
Minimum % Voids in Asphalt Mix Aggregate for 12.5mm Fine Asphalt Mix	15	15
% air voids in laboratory compacted mixture for 19mm Medium Asphalt Mix	2.5-4.5	2.5-4.5
% air voids in laboratory compacted mixture for 16mm Asphalt Mix	2.5-4.5	2.5-4.5
% air voids in laboratory compacted mixture for 12.5mm Fine Asphalt Mix	2.5-4.5	2.5-4.5
Minimum Marshall Load, N@60ºC for 80-100 Pen. And 120-150Pen.	9000	7000
Minimum Marshall Load, N@60ºC for 150-200 Pen. And 200-300Pen.	7000	6000
Flow index, units of 0.25mm	8-14	8-16
Minimum Asphalt Film Thickness, µm (microns)	8.0	8.0
Minimum Index of Retained Stability after immersion in water at 60ºC for 24 hours	85%	75%

.3 Do not change job-mix without prior approval of Departmental Representative. When change in material source proposed, new job-mix formula to be reviewed by Departmental Representative.

.4 Measure physical requirements as follows:

.1 Marshal load and flow value: to ASTM D1559.

.2 Air voids: to ASTM D3203

.3 Index of Retained Stability: measure in accordance with Marshall Immersion Test (ASTM D1559).

3 EXECUTION

3.01 PLANT AND MIXING REQUIREMENTS

.1 Batch and continuous mixing plants:

.1 To ASTM D 995.

.2 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders. Do not load frozen materials into bins.

.3 Feed cold aggregates to plant in proportions to ensure continuous operations.

.4 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.

.5 Before mixing, dry aggregates to moisture content not greater than 0.5% by mass or to lesser moisture content if required to meet mix design requirements.

.6 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.

.7 Store hot screened aggregates in manner to minimize segregation and temperature loss.

.8 Do not heat asphalt cement above 160 degrees C.

.9 Maintain temperature of materials within 5 degrees C of specified mix temperature during mixing.

.10 Mixing time:

.1 In batch plants, continue wet mixing as long as necessary to obtain thoroughly blended mix but not less than 30s or more than 75s.

.2 In continuous mixing plants, mixing time but not less than 45s.

.3 Do not alter mixing time unless directed by Departmental Representative.

.11 Where RAP is to be incorporated into mix:

.1 Feed from separate cold feed bin specially designed to minimize consolidation of material. Provide 37.5mm scalping screen on cold feed to remove oversized pieces of RAP.

.2 Ensure positive and accurate control of RAP cold feed by use of hydraulic motor or electric clutch and equip with anti rollback device to prevent material from sliding backward on feed belt.

.3 Combine RAP and new aggregates. Dry mix thoroughly, until uniform temperature within plus or minus 5 degrees C of mix temperature, prior to adding new asphalt cement. Do not add new asphalt cement where temperature of dried mix material is above 160 degrees C.

.2 Dryer drum mixing plant:

.1 To ASTM D 995.

.2 Load aggregates from individual stockpiles to separate cold feed bins. Do not load frozen materials into bins.

.3 Feed aggregates to burner end of dryer drum by means of multi-bin cold feed unit and blend to meet job-mix requirements by adjustments of variable speed feed belts and gates on each bin.

.4 Where RAP is to be incorporated into mix, dryer drum mixer is to be designed to prevent direct contact of RAP with burner flame or with exhaust gases hotter than 180 degrees C.

.5 Feed RAP from separate cold feed bin designed to minimize reconsolidation of material.

.6 Meter total flow of aggregate and RAP by an electronic weigh belt system with indicator that can be monitored by plant operator and which is interlocked with asphalt pump so that proportions of aggregate RAP and asphalt entering mixer remain constant.

.7 Provide for easy calibration of weighing systems for aggregates and RAP without having material enter mixer.

.8 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved. Calibrate weigh bridge on charging conveyor by weighing amount of aggregate passing over weigh bridge in set amount of time. Difference between this value and amount shown by plant computer system to differ by not more than plus or minus 2%.

.9 Make provision for conveniently sampling full flow of materials from cold feed.

.10 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate and RAP from cold feed prior to entering drum.

.11 Provide system interlock stop on feed components if either asphalt or aggregate from bin stops flowing.

.12 Accomplish heating and mixing of asphalt mix in approved parallel flow dryer-mixer in which aggregate enters drum at burner end and travels parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt mixture at discharge, with printing recorder that can be monitored by plant operator. Submit printed record of mix temperatures at end of each week, if required.

.13 Mixing period and temperature to produce uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves mixer to be less than 0.5%.

.3 Temporary storage of hot mix:

.1 Provide mix storage of sufficient capacity to permit continuous operation and designed to prevent segregation.

.2 Do not store asphalt mix in storage bins in excess of 12 hour.

.4 Mixing tolerances:

.1 Permissible variation in aggregate gradation from job mix (percent of total mass).

4.75 mm sieve and larger	5.5
2.36 mm sieve	4.5
0.600 mm sieve	3.5
0.150 mm sieve	2.5
0.075 mm sieve	1.5

.2 Permissible variation of asphalt cement from job mix: 0.3%.

.3 Permissible variation of mix temperature at discharge from plant: 5 degrees C.

3.02 PREPARATION

.1 Mill down area indicated minimum 38mm and remove waste material to facility capable of recycling material.

.1 Cold milling asphalt pavement shall be performed in a manner which prevents the tearing and breaking of underlying and adjacent pavement and the contamination of the reclaimed asphalt pavement (RAP) with granular, subgrade or deleterious materials. All RAP shall be loaded directly to trucks from the milling machine and hauled to stockpile or disposed of.

.2 In the event of rain or other inclement weather, the Contractor shall suspend cold milling operations. The Contractor shall make necessary allowances for drainage of water that may pond in areas where the milled sections have not been paved.

.2 When paving over existing asphalt surface, clean pavement surface. When leveling course is not required, patch and correct depressions and other irregularities before beginning paving operations.

.3 Adjust existing castings to new elevations and protect from asphaltic mix.

.4 When matching new pavement with existing pavement make vertical cut between existing pavement and new pavement.

.5 Apply prime coat and/or tack coat prior to paving.

.6 Prior to laying mix, clean surfaces of loose and foreign material.

3.03 TRANSPORTATION OF MIX

.1 Transport mix to job site in vehicles cleaned of foreign material.

.2 Paint or spray truck beds with limewater, soap or detergent solution, or non petroleum based commercial product, at least daily or as required. Elevate truck bed and thoroughly drain. No excess solution to remain in truck bed.

.3 Schedule delivery of material for placing in daylight.

.4 Deliver material to paver at uniform rate and in an amount within capacity of paving and compacting equipment.

.5 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at temperature not less than 125 degrees C.

3.04 PLACING

.1 Obtain Departmental Representative's approval of base and existing surface and tack coat and prime coat prior to placing asphalt.

.2 Place asphalt concrete to thicknesses and lines as shown on Contract Drawings. Finished surface to be flush with existing asphalt, without ponding.

.3 Placing conditions:

.1 Place asphalt mixtures only when air temperature is above 5 degrees C. Place overlay pavement only when air temperature is above 10 degrees C.

.2 When temperature of surface on which material is to be placed falls below 10 degrees C, provide extra rollers as necessary to obtain required compaction before cooling.

.3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.

.4 Spread and strike off mixture with self propelled mechanical finisher.

.5 Construct longitudinal joints and edges true to line markings. Position and operate paver to follow established line closely.

.6 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver. Work pavers as close together as possible and in no case permit them to be more than 30 m apart.

.7 Maintain constant head of mix in auger chamber of paver during placing.

.8 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.

.9 Correct irregularities in alignment left by paver by trimming directly behind machine.

.10 Correct irregularities in surface of pavement course directly behind paver. Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.

.11 Do not throw surplus material on freshly screeded surfaces.

.12 When hand spreading is used:

.1 Use approved wood or steel forms, rigidly supported to assure correct grade and cross section. Use measuring blocks and intermediate strips to aid in obtaining required cross-section.

.2 Distribute material uniformly. Do not broadcast material.

.3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered rakes. Reject material that has formed into lumps and does not break down readily.

.4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.

.5 Provide heating equipment to keep hand tools free from asphalt. Control temperature to avoid burning material. Do not use tools at higher temperature than temperature of mix being placed.

3.05 COMPACTING

.1 Roll asphalt continuously to density not less than 97% of 75 blow Marshall density to ASTM D1559 with no individual test less than 95%.

.2 General:

.1 Provide at least two rollers and as many additional rollers as necessary to achieve specified pavement density. When more than two rollers are required, one roller must be pneumatic tired type.

.2 Start rolling operations as soon as placed mix can bear weight of roller without excess displacement of material or cracking of surface.

.3 Operate roller slowly initially to avoid displacement of material. For subsequent rolling do not exceed 5 km/h for static steel-wheeled and 8 km/h for pneumatic tired rollers.

.4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per metre of travel. For lifts less than 50 mm thick, impact spacing not to exceed compacted lift thickness.

.5 Overlap successive passes of roller by minimum of 200mm and vary pass lengths.

.6 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.

.7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.

.8 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.

.9 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side. Ensure that all points across width of pavement receive essentially equal numbers of passes of compactors.

.10 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll when joint between lanes is rolled.

.11 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.

.3 Breakdown rolling:

.1 Commence breakdown rolling immediately following rolling of transverse and longitudinal joint and edges.

.2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.

.3 Operate breakdown roller with drive roll or wheel nearest finishing machine. Exceptions may be made when working on steep slopes or super-elevated sections.

.4 Use only experienced roller operators for this work.

.4 Second rolling:

.1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.

.2 Rolling to be continuous after initial rolling until mix placed has be thoroughly compacted.

.5 Finished rolling:

.1 Accomplish finish rolling with steel wheel rollers while material is still warm enough for removal of roller marks.

.2 Conduct rolling operations in close sequence.

3.06 JOINTS

.1 General:

.1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.

.2 Construct joints between asphalt concrete pavement and Portland cement concrete pavement as indicated.

.3 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.2 Transverse joints:

.1 Offset transverse joint in succeeding lifts by at least 600mm.

.2 Cut back to full depth vertical face and tack face with thin coat of hot asphalt prior to continuing paving.

.3 Compact transverse joints to provide smooth riding surface. Use methods to prevent rounding of compacted surface at joints.

.3 Longitudinal joints:

.1 Offset longitudinal joints in succeeding lifts by at least 150mm.

.2 Cold joint is defined as joint where asphalt mix is placed, compacted and left to cool below 100 degrees C prior to paving of adjacent lane.

.1 If cold joint can not be avoided, tack face with thin coat of hot asphalt prior to continuing paving.

.2 Overlap previously laid strip with spreader by 100mm.

.3 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with lute or rake.

.4 Roll longitudinal joints directly behind paving operation.

.5 When rolling with static roller over onto previously placed lane inorder that 100 to150 mm of drum width rides on newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until thoroughly compacted neat joint is obtained.

.6 When rolling with vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.

.4 Construct feather joints so that thinner portion of joint contains fine graded material obtained by changed mix design or by raking out coarse aggregate in mix. Place and compact joint so that joint is smooth and without visible breaks in grade. Location of feather joints as indicated.

.5 Construct butt joints as indicated.

.6 Wherever practical, locate joints under future traffic markings (paint lines).

3.07 PAVEMENT PATCHING

.1 Ensure temporary and permanent pavement patching done by handwork conforms to all standards specified for machine place asphaltic concrete.

3.08 FINISH TOLERANCES

.1 Finished asphalt surface to be within 6mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 6mm when checked with 3 m straight edge placed in any direction.

.3 Water ponding not permitted.

.4 Against concrete gutter, finished asphalt surface to be higher than the gutter by not more than 6mm.

3.09 FIELD QUALITY CONTROL

.1 Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

.2 Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.

.3 Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

.4 Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

.5 Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

.6 In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement.

.1 Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.

.2 In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

.1 Two core sample will be taken.

.2 Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

.7 Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.10 DEFECTIVE WORK

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form true and even surface and compact immediately to specified density.

.2 Repair areas showing checking, rippling, or segregation.

.3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.11 CLEAN UP

.1 Remove lids or covers from all castings and clean any prime, tack coat or hot-mix asphaltic concrete from frames, lids and covers of all castings.

END OF SECTION

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1 GENERAL

1.01 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 03 30 00 – Cast-in-Place Concrete.

.3 Section 03 35 00 – Concrete Finishes.

1.02 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C 117, Standard Test Method for Materials Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D 260, Standard Specification for Boiled Linseed Oil.

.4 ASTM D 698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-3.3, Kerosene, Amend. No. 1, National Standard of Canada.

.2 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.

.3 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.03 SUBMITTALS

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

2 PRODUCTS

2.01 MATERIALS

.1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete with the following criteria specific to this Section:

.1 Hand-formed and hand-placed concrete:

Slump: 80mm.

Air entrainment: 5 to 8%.

Maximum aggregate size: 20mm.

Minimum cement content: 335 kg/m³.

Minimum 28-day compressive strength: 32 MPa.

.2 Extruded concrete:

Slump: 0 – 25 mm.

Air entrainment: 6 to 9%.

Maximum aggregate size: 10mm.

Fineness modulus: 2.1 to 2.4.

Minimum cement content: 335 kg/m³.

Minimum 28-day compressive strength: 32 MPa.

.2 Joint filler and Curing Compound: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.3 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.

3 EXECUTION

3.01 GRANULAR SUBBASE AND BASE

.1 Place subbase and minimum of 100mm granular base material to design grade as shown on Contract Drawings.

.2 Compact subbase and base to minimum 95% Modified Proctor density.

.3 Obtain Departmental Representative's approval of compacted base prior to placing forms or control devices for extruding equipment.

3.02 FORMWORK

.1 Ensure steel forms of approved design and free from twists and warp.

.2 Ensure wood forms of select dressed lumber, straight and free from defects and thoroughly cleaned.

.3 Use flexible forms for all curves less than 60 m radius.

.4 After obtaining Departmental Representative's approval of compacted base, set forms to line and grade as shown on Contract Drawings, free from waves or irregularities in line or grade.

.5 Set special isolation forms as required around catch basins, manholes, poles or other objects as shown on Contract Drawings or as directed by Departmental Representative.

.6 Forms to be to shape, lines and full dimensions of work being formed.

.7 Adequately brace forms to maintain specified tolerances after concrete is placed.

.8 Treat forms lightly with approved form release agent and remove surplus agent.

3.03 INSPECTION

.1 Immediately prior to placement of concrete, carefully inspect all formwork to ensure forms are properly set at required horizontal and vertical alignment, sufficiently rigid, clean, surface treated and ready for placement of concrete. Obtain Departmental Representative's approval of formwork and compacted base.

3.04 CONCRETE PLACEMENT

.1 Place concrete to Section 03 30 00 – Cast-In-Place Concrete and the following criteria specific to this Section.

.2 Do not place concrete during rain or on ponded water or frozen base.

.3 Do not place concrete when air temperature appears likely to fall below 5°C within 24 h, unless specified precautions are taken and approved by Departmental Representative.

.4 Schedule concrete placement to ensure sufficient daylight hours available to permit edging and finishing or provide adequate illumination.

.5 Moisten granular base immediately prior to placing Concrete.

.6 Place concrete within 1.5 h of batching time.

.7 Place concrete in forms, ensuring no segregation of aggregate and consolidate with approved mechanical vibrator or power screed.

.8 Place concrete in continuous operation until entire panel or section completed. Do not place fresh concrete on concrete which has achieved partial set.

.9 Incorporate all castings into concrete at time of placement.

.10 Discontinue placement at expansion, construction, or isolation joints only.

.11 Remove face forms as soon as practical to permit face finishing. Do not leave face forms in place overnight.

3.05 DRIVEWAY CROSSINGS AND WHEELCHAIR RAMPS

.1 Construct driveway crossings and wheelchair ramps where shown on Contract Drawings. Replacement wheelchair ramps to match existing.

3.06 TOLERANCES

.1 Maximum horizontal deviation = 6 mm.

.2 Maximum vertical deviation = 6 mm.

.3 Maximum deflection from horizontal or vertical alignment to be 6 mm in 3 m.

3.07 EXPANSION JOINTS

.1 Form transverse expansion joints at both ends of curb returns and at a maximum spacing of 9 m for sidewalks, 9 m for curb and gutter, at each end of driveway crossings and at tangent points on circular work.

.2 Extend through full depth of concrete.

.3 Fill with 13 mm approved expansion joint material.

.4 Bond break compound may be used in lieu of expansion joint between sidewalk and back of abutting curb and gutter or where applicable between sidewalk and back of abutting utility strip or sidewalk infill.

3.08 CONTROL JOINTS

.1 In sidewalks, construct control joints at maximum 3 m intervals.

.2 In curb or curb and gutter construct control joints at maximum 3 m intervals and match with control joints in butting sidewalk.

.3 Cut to minimum depth of concrete section.

.4 Use proper tool to make cut while concrete is still green or sawcut after concrete has hardened.

3.09 ISOLATION JOINTS

.1 Form isolation joints around all poles, hydrants, manholes and all structures or fixed objects located within the concrete section by using specified joint filling material.

.2 Form longitudinal isolation joints between sidewalk and abutting curb and gutter, abutting utility strips, abutting structures using 13 mm approved joint filling material.

.3 Use 13 mm asphalt impregnated fiberboard to form isolation joints between sidewalks and abutting walls, structures and steel columns.

3.10 FINISHING

.1 Finish surface of concrete sidewalks and utility strips to smooth surface with magnesium or wood float and brush or broom to provide uniform non-skid surface.

.2 Broom or brush crossways or as otherwise required to match adjacent finish or as directed by Departmental Representative.

.3 Grooves or scoring (dummy joints) used for aesthetic purposes as shown on the Contract Drawings or as directed by Departmental Representative, to be marked with proper tools and set 15 mm deep.

.4 Finish driveway Crossings and wheelchair ramps to match existing.

.5 Round edges with steel edging tool to a width of 50mm around perimeter of each panel.

.6 Ensure surface of hand-formed curb and gutter is smooth magnesium or wood float finish. Ensure extruded Curb and gutter is smooth finished and hand floated as required to correct irregularities.

.7 Under no circumstances is concrete to be overworked by troweling, dusted with dry cement or finished with a mortar coat.

.8 Ensure finished surface as specified.

3.11 PROTECTION

.1 Protect freshly finished concrete from dust, rain or frost by using tarpaulins or other suitable protective coverings. Keep clear of finished surface.

.2 Place and maintain suitable barriers to protect finished concrete from equipment, vehicles, or pedestrian traffic.

.3 Provide personnel as required to prevent vandalism until concrete has set.

.4 Do not run vehicles or construction equipment on concrete for at least 3 days.

3.12 CURING

.1 Apply approved curing compound to all exposed concrete surfaces at rate recommended by manufacturer or alternatively, use moist curing procedures for a minimum of 7 days.

.2 When temperature is below 5°C, maintain all concrete at temperature not less than 10°C for at least 72 h and protect from freezing for at least another 72 h or such time as required to ensure proper curing of concrete. Admixtures are not to be used for prevention of freezing.

3.13 ACCEPTANCE

.1 Before acceptance of finished concrete remove all irregular, cracked, vandalized or otherwise defective sections and replace in accordance with specifications.

.2 Minimum area of replacement of defective sidewalk is one panel section.

END OF SECTION

APPENDIX A
for

CBSA Canopy Assessment and Repairs
Aldergrove Port of Entry, Langley, BC

Project No.: R.106402.001

HEALTH AND SAFETY WORK PERMIT

PURPOSE: To increase safety and security, all work activities managed by BGIS, PSPC, or Tenants that require contractor access to any part of BGIS managed facilities must have a Work Permit.

INSTRUCTION:
1. Fill in all relevant fields completely. Permits with blank fields may be rejected.
2. E-mail the completed Permit to the email address listed for your region on the final page of this document.
3. Await authorization from BGIS prior to commencing work.
4. Retain a hard or soft copy of the authorized Work Permit. An authorized Work Permit must be available on site every day for the duration of this job or project.

NOTE: To ensure timely authorization, please submit the Work Permit **at least 2 Full Working Days** prior to the anticipated start time of work activities.
Permits are only issued for 1 week time blocks. Longer work requires multiple permits. **ANY change to work requires a new permit**
All Workers need to complete BGIS online orientation. (Available via Comply Works or through HSE Coordinator).

LOCATION OF THE WORK

Province / Territory: City:

Floor/ Room Number:

Building (Name or Address):

WORK INITIATOR (BUYER OF SERVICE)

Work Requested By (Name of Person):

Work Order # or Project # (If Applicable):

DATES OF WORK		WORK HOURS						
☐ Day Time	☐ After Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Start Date								
End Date								

WORK DESCRIPTION - (Provide a detailed description of the work to be conducted. Attach a job safety plan as appropriate)

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RISK ASSESSMENT

Please note, this Risk Assessment is not intended to replace a Job Safety Assessment (JSA). "Controls" as identified are intended as prompts for the permit authorizer. The permit holder is responsible for conducting a proper JSA and safety briefing to the workers prior to the commencement of the work and implementing any additional controls that may be required specific to the work task.

	Work Consideration	Yes/No	If Yes, See Associated Control
1.	Have Building Specific OHS Documents & Hazards (including asbestos surveys/hazardous substances surveys) been reviewed by those conducting work?		A
2.	Will asbestos / other hazardous materials be disrupted during work activities?		A, B,K
3.	Will the work create dust, smoke, heat, vibration or otherwise impact the Fire Life Safety System?		C, G, H, I, J
4.	Will building systems be impacted or impaired (Fire Life Safety, HVAC, lighting, elevator, etc.)?		E
5.	Involves electrical or mechanical disruption?		B, E, H
6.	Requires energy isolation?		B, H, I
7.	Requires work from heights (excluding ladders)?		B, G, H, I
8.	Will the work involve ladders or work platforms?		L
9.	Requires access to a secure area where escort may be needed?		F
10.	Requires access to a “Confined” or “Restricted” Space?		B, G, H, I
11.	Workers have all licenses, training, and tools needed to perform task?		I
12.	Could generate noise?		K
13.	Could generate odours?		C, K, M
14.	Requires obstruction of building access or egress?		K, D, G
15.	Involves working around or with hazardous chemicals?		B, M
16.	Work taking place at heritage site?		N
17.	Workers conducting work have reviewed all BGIS Covid-19 Supplier Requirements Updates?		B, O

	Controls
A.	Review of Asbestos Survey / BGIS Document Library required.
B.	Specialized Personal Protective Equipment and Work Procedures required.
C.	System Bypass Permit.
D.	Security Coverage required.
E.	Shutdown Notice required.
F.	Additional Clearance or Authorized Escort required.
G.	Safety Barriers required.
H.	Additional High Hazard Permit required (Confined Space, LOTO, etc.).
I.	Additional License or Certifications required (Confined Space, Fall Arrest, etc.).
J.	Notify Fire Department / Fire Alarm Monitoring Company.
K.	Tenant Notification or Escort required.
L.	Ensure the Ladder/Work Platform is on a stable surface and is set up and used according to manufacture specifications.
M.	Ensure SDS are available.
N.	Conservation Plan required.
O.	Ensure Established Protocols are in place and available for Covid-19 that align with Public Health Canada Guidelines.

Permit Holder/ Contractor Details

Company Name:	
Permit Holder (Site Supervisor):	
Permit Holder Contact Number:	
Permit Holder Email:	
Names of All Workers to be on site (attach separate list if required):	

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BGIS HS REVIEW

Name of Reviewer:			
Date of Review:		Authorized:	
Comments:	We thank you for your service during this challenging time and ask that your team remain diligent with the latest health authority guidance around COVID 19 when on site, this would include maximizing the use of phone calls with our onsite maintenance Technician rather than face to face where possible. Our Maintenance teams have been asked to keep their office doors closed to reinforce social distancing while we all work through this pandemic.		

BGIS BUYER OF SERVICE REVIEW

Name of Reviewer:			
Date of Review:		Authorized:	
Comments:			

EMAIL COMPLETED WORK PERMIT TO THE ADDRESS LISTED FOR YOUR REGION

Region	Region Description	Email Address
Atlantic	Newfoundland, PEI, NB, NS	ATL-RP1workpermit@BGIS.com
Quebec	Quebec (Other Than Gatineau)	QC-RP1workpermit@BGIS.com
National Capital Area	Ottawa, Gatineau	NCA-RP1workpermit@BGIS.com
Ontario	Ontario (Other Than Ottawa)	ON-RP1workpermit@BGIS.com
Western	Manitoba, Saskatchewan, Alberta, NWT, Nunavut	WEST-RP1workpermit@BGIS.com
Pacific	British Columbia, Yukon	PAC-RP1workpermit@BGIS.com

Questions regarding the Work Permit process can be sent to the region-specific email address