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**BID DOCUMENTS AND SPECIFICATIONS**

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Project: **Tunnel Expansion Joint Replacement**

At  
**NDMC**  
**Ottawa, ON**  
**R.065220.541**

Prepared for: **PUBLIC SERVICES AND PROCUREMENT CANADA**

Client's Project Number.: **R.065220.541**



16-05-2022

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 01 – General Requirements</u>		
01 00 10	GENERAL REQUIREMENTS.....	2
01 14 25	DESIGNATED SUBSTANCES.....	3
01 31 16	PROJECT MEETINGS.....	2
01 32 16	CONSTRUCTION PROGRESS SCHEDULE - BAR (GANTT) CHART.....	3
01 33 00	SUBMITTAL PROCEDURES.....	5
01 35 29.06	HEALTH AND SAFETY REQUIREMENTS.....	5
01 35 35	DND FIRE SAFETY.....	6
01 41 00	REGULATORY REQUIREMENTS.....	2
01 45 00	QUALITY CONTROL.....	2
01 51 00	TEMPORARY UTILITIES.....	2
01 52 00	CONSTRUCTION FACILITIES.....	3
01 56 00	TEMPORARY BARRIERS AND ENCLOSURES.....	2
01 61 00	COMMON PRODUCT REQUIREMENTS.....	4
01 71 00	EXAMINATION AND PREPARATION.....	2
01 73 00	EXECUTION.....	2
01 74 21	CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL.....	8
01 78 00	CLOSEOUT SUBMITTALS.....	5
<u>Division 02 – Existing Conditions</u>		
02 83 13	LEAD-BASED PAINT ABATEMENT – MINIMUM PRECAUTION.....	9
<u>Division 03 – Concrete</u>		
03 10 00	CONCRETE FORMING AND ACCESSORIES.....	3
03 20 00	CONCRETE REINFORCING.....	4
03 30 00	CONCRETE AND CONCRETE REPAIRS.....	7
<u>Division 04 – Masonry</u>		
04 05 15	MASONRY MORTARING AND GROUTING.....	1
<u>Division 07 – Thermal &amp; Moisture Protection</u>		
07 13 52.13	MODIFIED BITUMINOUS SHEET WATERPROOFING.....	3
07 92 00	JOINT SEALING.....	3
07 95 13	EXPANSION JOINT ASSEMBLIES.....	3
<u>List of Drawings</u>		
A0 – Table of Contents	A5.1 – Section Detail	
A1.1 – Site Plan & Scope of Work	A5.2 – Section Detail	
A1.2 – Additional Site Plan	A6 – Interior Floor Expansion Joint Detail	
A1.3 – West Entrance Walkway Floor Plan	A7 – Window Detail	
A1.4 – West Entrance Walkway Details	A8.1 – Expansion Joint Wall and Ceiling (Exterior) Detail	
A2 – Interior Floor Plans	A8.2 – Expansion Joint Wall and Ceiling (Exterior) Detail	
A3 – Exterior Elevations (North)	A9 – Brick Repointing Detail	
A4 – Exterior Plan View (Exposed Walkway Above Tunnel)		

16-05-2022

## PART 1 - GENERAL

### 1.1 TAXES

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

### 1.2 FEES, PERMITS AND CERTIFICATES

- .1 Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction.

### 1.3 DRAWINGS AND SPECIFICATIONS

- .1 The attached drawings are complementary to this specification.
- .2 Review contract documents with material manufacturer for products intended for use. Obtain mutual agreement that the details and specifications are appropriate and adequate for the construction and/or renovations set out.
- .3 Ensure that materials and methods are appropriate and compatible with other components being utilised.

### 1.4 HAZARDOUS MATERIALS

- .1 Hazardous Materials: product, substance, or organism that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .2 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of Material Safety Data Sheets (MSDS) acceptable to Human Resources Development Canada, Labour Program.
- .3 For work in occupied buildings give the Departmental Representative 48 hours notice for work involving designated substances (Ontario Bill 208), hazardous substances (Canada Labour Code Part II Section 10), and before painting, caulking, or using adhesives.

### 1.5 CLEANING

- .1 Clean up work area as work progresses. At the end of each work period and more often if ordered by the Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally.
- .2 Upon completion removes scaffolding, temporary protection and surplus materials. Make good defects noted at this stage.
- .3 Clean manufactured articles in accordance with manufacturer's directions.
- .4 Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative.

### 1.6 SECURITY CHECK

- .1 Personnel will be checked daily at start of work shift and given a pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

16-05-2022

## 1.7 PRECEDENCE

- .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

## PART 2 - PRODUCTS

### 2.1 NOT USED

- .1 Not Used.

## PART 3 - EXECUTION

### 3.1 NOT USED

- .1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 REFERENCES

#### .1 Federal Legal Requirements

- .1 Canada Labour Code, Part II, section 124 and 125. Canada Occupational Health and Safety Regulations, as amended.
- .2 Transportation of Dangerous Goods Act, 1992 (TDGA), as amended
- .3 PSPC Asbestos Management Directive
- .4 Canada Consumer Product Safety Act
  - .1 Surface Coating Materials Regulations SOR/2005-109, as amended.
- .5 Canadian Environmental Protection Act, 1999 (CEPA)

#### .2 Provincial Legal Requirements

- .1 Ontario Occupational Health and Safety Act, R.S.O. 1990, as amended.
  - .1 Ontario Regulation 490/09 – Designated Substances (O.Reg. 490/09), as amended
  - .2 Ontario Regulation 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations, (O.Reg. 278/05), as amended
  - .3 Ontario Regulation 213/91 for Construction Projects (O.Reg. 213/91), as amended.
- .2 Ontario Environmental Protection Act, R.R.O. 1990,
  - .1 Ontario Regulation 347/09, General – Waste Management (O.Reg. 347/09), as amended.
- .3 Canadian General Standards Board (CGSB).
- .4 Canadian Standards Association (CSA International). CAN/CSA-Z94.4-11 -Respiratory Protection
- .5 Underwriters' Laboratories of Canada (ULC).

### 1.2 DEFINITIONS

- .1 Time-Weighted Average Exposure Limit (TWael): the time-weighted average airborne concentration of a biological or chemical agent to which a worker may be exposed in a work day or work week as prescribed by Ontario Regulation 490/09 Designated Substances, as amended.

### 1.3 RELATED SECTIONS

- .1 Not used

### 1.4 DESIGNATED SUBSTANCES

- .1 Prior to the commencement of any work activities, confirm with the Departmental Representative that no additional designated substances have been introduced or identified to the project area.
- .2 Note that additional designated substances and hazardous materials may exist outside the accessible survey area but are beyond the scope of this project.

16-05-2022

- .3 In the event that additional material suspected to contain designated substances or hazardous materials is encountered within the project area, the Departmental Representative must be notified immediately, and any disturbance of such material must be stopped, and precautionary measures taken. Do not proceed further until written instructions have been received.

.1 ACRYLONITRILE: Not Identified

.2 ARSENIC: Not Identified

.3 ASBESTOS: Not Identified

Based on the analytical sample results, the grey mortar, on the north side wall, in the basement, in the service tunnel, does not contain regulated amounts of asbestos.

.4 BENZENE: Not Identified

.5 COKE OVEN EMISSIONS: Not Identified

.6 ETHYLENE OXIDE: Not Identified

.7 ISOCYANATES: Not Identified

.8 LEAD: Identified

Analytical results indicate that the lead content in the white paint exceeds the 90ppm threshold outlined in the Canada Consumer Product Safety Act's Surface Coating Materials Regulations SOR/2005-109 (as amended), and therefore is considered to be a lead-based containing paint.

.9 MERCURY: Identified / Not Identified

.10 SILICA: Identified

Free crystalline silica is expected to be present in concrete and mortar in the project area.

.11 VINYL CHLORIDE MONOMER: Not Identified

.12 POLYCHLORINATED BIPHENYLS (PCBs): Not Identified

.13 OZONE DEPLETING SUBSTANCES (ODS): Not Identified

## 1.5 RECOMMENDATIONS

### .1 1. LEAD

.1 All work involving disturbance of lead-containing materials must be done in accordance with O.Reg 490/09.

.2 Follow recommendations provided in the Ontario Ministry of Labour (MoL) Guideline entitled "Guideline: Lead on Construction Projects". This guideline classifies all lead disturbances as Type 1, Type 2a, Type 2b, Type 3a or Type 3b work, and assigns different levels of respiratory protection and work procedures for each classification.

.1 Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne lead levels that exceed the TWAEL of 0.05 milligram per cubic metre (mg/m3) prescribed by O.Reg 490/09.

.2 The use of mechanically-powered tools or torches on lead-containing materials increases the concentration of airborne lead dust or fumes requiring more stringent respiratory protection and controlled work procedures.

16-05-2022

- .3 Disposal of construction waste containing lead must be done in accordance with O.Reg 347/90 "General – Waste Management" (as amended) under the Ontario Environmental Protection Act and the federal Transportation of Dangerous Goods Act.

- .2 SILICA

- .1 Any work activities that may disturb silica-containing materials must comply with Ontario Regulations O.Reg 490/09. The regulation sets guidelines for maximum allowable exposure levels.
- .2 Recommendations provided in the MoL Guideline entitled "Guideline: Silica on Construction Projects" are to be followed. This document classifies all silica disturbances as Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. These work procedures should be followed when performing work involving the disturbance of silica-containing materials. Disposal of waste should be conducted in accordance with local, municipal, provincial, and/or federal jurisdictions having authority.

## PART 2 - PRODUCTS

### 2.1 NOT USED

- .1 Not Used.

## PART 3 - EXECUTION

### 3.1 NOT USED

- .1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 ADMINISTRATIVE

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

### 1.2 PRECONSTRUCTION MEETING

- .1 Within fifteen (15) working 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, and field inspectors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum five (5) working days before meeting.
- .4 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.
  - .3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00.
  - .4 Requirements for temporary facilities, site sign, offices, storage shed, utilities, fences in accordance with Section 01 51 00.
  - .5 Site security in accordance with Section 01 56 00.
  - .6 Health and safety in accordance with Section 01 35 29.06.
  - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .8 Departmental Representative provided products.
  - .9 Record drawings and specifications in accordance with Sections 01 33 00 and 01 78 00.
  - .10 Maintenance manuals in accordance with Section 01 78 00.



16-05-2022

- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00.
- .12 Monthly progress claims, administrative procedures, photographs, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.

### 1.3 PROGRESS MEETINGS

- .1 During course of Work and two (2) weeks prior to project completion, schedule progress meetings bi-weekly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum five (5) working days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) working days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Other business.

## PART 2 - PRODUCTS

### 2.1 NOT USED

- .1 Not Used.

## PART 3 - EXECUTION

### 3.1 NOT USED

- .1 Not Used.

## PART 1 - GENERAL

### 1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and 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 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 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 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.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

### 1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail 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, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.

### 1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Submit to Departmental Representative within seven (7) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within five (5) working days of receipt of acceptance of Master Plan.

#### 1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
  - .1 Site Mobilization completed within thirty (30) working days of Award of Contract date.
  - .2 Demolition and Vapour Barrier completed within five (5) working days of Site Mobilization completed.
  - .3 Rough Carpentry completed within five (5) working days of Demolition and Vapour Barrier completed.
  - .4 New roof system, including all membrane and membrane flashings, within twenty (20) working days Rough Carpentry completed.
  - .5 Sheet metal flashings, mechanical, and electrical work completed within ten (10) working days of new roof system completed.
  - .6 Certificate of Substantial Performance within sixty (60) working days of Award of Contract date.

#### 1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

#### 1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Demolition.
  - .6 Vapour Barrier.
  - .7 Rough Carpentry.
  - .8 Nee Roof System.
  - .9 Sheet Metal Flashings.
  - .10 Plumbing.
  - .11 Heating, Ventilating, and Air Conditioning.

## 1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on weekly basis 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 forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

## 1.8 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings [specified in Section 01 31 19], 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.

## PART 2 - PRODUCTS

### 2.1 NOT USED

- .1 Not used.

## PART 3 - EXECUTION

### 3.1 NOT USED

- .1 Not used.

16-05-2022

## PART 1 - GENERAL

### 1.1 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 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples, and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated, and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.
- .11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, and AutoCAD dwg files on USB compatible with PSPC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

### 1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow five (5) working days for Departmental Representative's review of each submission.
- .5 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 Work.

16-05-2022

- .6 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.
- .7 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.
- .8 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

16-05-2022

- .11 Submit one electronic copy 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.
- .12 Submit one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Report signed by authorized official of testing laboratory that material, product, or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within three (3) years of date of contract award for project.
- .13 Submit one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit one electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 The review of shop drawings by Public Services and Procurement Canada (PSPC) is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that PSPC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

16-05-2022

### 1.3 SAMPLES

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

### 1.4 MOCK-UPS

- .1 Erect mock-ups in accordance with Section [01 45 00].

### 1.5 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 2 locations.
  - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: as directed by Departmental Representative].
  - .1 Upon completion of demolition, new roof system of all Work, and as directed by Departmental Representative.

### 1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Safety and Insurance Board Experience Report.

### 1.7 FEES, PERMITS AND CERTIFICATES

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and permits required.
- .3 Furnish certificates and permits.
- .4 Submit acceptable certificate stating that suspended ceiling systems provide adequate support for electrical fixtures, as required by current bulletin of Electrical Inspection Department of Ontario Hydro.



16-05-2022

## PART 2 - PRODUCTS

### 2.1 NOT USED

.1 Not Used.

## PART 3 - EXECUTION

### 3.1 NOT USED

.1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Province of Ontario
  - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, c.0.1, as amended and O. Reg. 213/91 as amended - Updated 2005.

### 1.2 ADDITIONAL REFERENCES

- .1 The Contractor shall comply with the latest edition and amending regulations of the following documents, and in the case of conflicts between documents, the more stringent rule shall apply:
  - .1 Hazardous Projects Act and the Canada Labour Code, most recent edition.
  - .2 The Workplace Safety and Insurance Act, 1997 as amended by 1997, c. 26, Sched.; 1998, c. 36; 1999, c. 6, s. 67; 2000, c.26, Sched.I; 2001, c.9, Sched. I, s.4; 2002, c.8, Sched.P, s.8; 2002, c.18, Sched.J, s.5; 2004, c.8, ss.46, 47 (2); 2004, c.17, s.32; 2005, c.5, s.73; 2005, c.29, s.7; 2006, c.13, s.4; 2006, c.19, Sched.M, s.7.
  - .3 Ontario Building Code Act S.O. 1992, c. 23, and Ontario Regulation 403/97 as amended to O. Reg. 422/06.
  - .4 The Ontario Fire Code, O. Reg. 388/97 as amended by 315/01.
  - .5 Regulation 447 - Environmental Protection Act as amended to O. Reg. 237/07.
  - .6 Workplace Safety and Insurance Board, Regulation 1101, First Aid Requirements.
  - .7 National Building Code 2015, Part 8: Safety Measures at Construction and Demolition Sites.
  - .8 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit site-specific Health and Safety Plan: Within seven (7) working days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Results of site-specific safety hazard assessment
  - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .2 Submit two (2) copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.
- .3 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .4 Submit copies of incident and accident reports.
- .5 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

16-05-2022

- .6 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .7 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.

#### 1.4 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

#### 1.5 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.
- .2 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

#### 1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

#### 1.7 GENERAL REQUIREMENTS

- .1 Develop a written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

#### 1.8 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.

#### 1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1 and Ontario Regulations for Construction Projects, O. Reg. 213/91.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

#### 1.10 UNFORESEEN HAZARDS

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

16-05-2022

**1.11 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

**1.12 CORRECTION OF NON-COMPLIANCE**

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

**1.13 BLASTING**

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

**1.14 POWDER ACTUATED DEVICES**

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

**1.15 WORK STOPPAGE**

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

**1.16 FALL PROTECTION**

- .1 Comply with Occupational Health and Safety Act and Regulations for Construction Projects, Section 26, as described herein but not limited too:
  - .1 Fall protection will be required when a worker is exposed to a fall of more than 3 metres.
  - .2 Fall protection shall be in the form of:
    - .1 Guardrail system
    - .2 Travel restraint system
    - .3 Fall restricting system
    - .4 Fall arrest system
  - .3 The components of any system listed above shall be designed by a professional engineer in accordance with good engineering practice and shall meet the requirements of any of the National Standards of Canada that are applicable.
- .2 A wood guardrail system shall consist of a top rail, intermediate rail, and a toe board. The top rail shall be located at least 0.9m but no more than 1.1m above the surface on which the system is installed. The toe board shall extend at least 89mm above the surface on which the system is installed. The maximum distance between two adjacent posts of the guardrail system shall be 2.4m. Wood shall be SPF construction grade quality or better. Members shall be at least 38mm by 89mm. Members to resist prescribed point loads.

- .3 A travel restraint system shall consist of a full body harness (with adequate attachment points) or a safety belt. The full body harness or safety belt shall be attached by a lifeline or lanyard to a fixed support able to resist the prescribed static and dynamic forces.
- .4 A fall restrict system shall consist of assembly of components attached to a fixed support able to resist the prescribed static and dynamic forces. Worker's free fall distance must not exceed 0.6m.
- .5 A fall arrest system shall consist of a full body harness with adequate attachment points and a lanyard equipped with a shock absorber. The fall arrest system shall be attached by a lifeline or lanyard to a fixed support able to resist the prescribed static and dynamic forces. The fall arrest system shall be arranged so that a worker cannot hit the ground or an object or level below the work. The worker who falls shall not be subjected to a fall arrest force greater than 8 kilonewtons.

#### 1.17 SITE FENCING

- .1 All equipment, machinery and materials stored on the ground must be cordoned off with a solid fence.
- .2 Ground areas below area of work on the roof must be fenced off to keep all pedestrian traffic a minimum of 4.5m from building. Fence shall be a minimum of 1.8m in height.
- .3 Any/all fencing to be constructed of modular steel fencing. Fencing to be constructed in such a manner that it is not easily knocked over. Minimum height of fence to be 1.8m above grade.

#### 1.18 SAFETY AND SECURITY REQUIREMENTS

- .1 Enforce use of CSA approved hardhats and safety boots for all entering or working on construction site.
- .2 The Contractor shall remove from the site any persons not observing or complying with safety requirements.
- .3 The Contractor will report to the Departmental Representative, and jurisdictional authorities, any accident or incident involving the Contractor, the Departmental Representative, or the public; personnel and/or property, arising from the Contractor's execution of the work.
- .4 The Contractor will include all provisions of the Contract in so far as they are pertinent in any agreement with Sub-contractors and hold all Sub-contractors equally responsible for safe work performance.
- .5 Delays in the progress of the Work arising out of infractions of legislation or Contract health and safety requirements are the responsibility of the Contractor.
- .6 Provide and maintain adequate lighting where workmen or public may be subject to hazards and in all working areas.
- .7 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and the provision of material safety data sheets.
- .8 In addition to the requirements of the Occupational Health and Safety Act, and Regulations for Construction Projects, provide temporary safeguards and protection against:
  - .1 Accident or injury to any workmen or other persons on the site, adjacent work and property, roads, and walks.
  - .2 Damage to any part of the work and to any adjoining or adjacent structure, properties, pavements, walks, services, and other similar items by frost, weather, overloading, and any other cause resulting from the execution of the work.

16-05-2022

- .9 Make good with material identical with existing and adjoining surfaces any damage resulting from the execution of the work to any part of the work or any buildings, pavements, landscaping, poles, hydrants, services, etc., on or surrounding the site.
- .10 Portable fire extinguishers, with a minimum rating of 4A:40B:C, shall be:
  - .1 Located within 6m of persons using an open flame torch or other ignition source,
  - .2 Readily available to all other persons around hot surface applications and fire watch personnel and,
  - .3 Located no further than 7.6m and no closer than 1.5m from a bitumen kettle.
- .11 Adhere to Departmental Representative's site-specific Health and Safety policies, as applicable, which include the following:
  - .1 Use of hard hats and safety boots
  - .2 WHMIS: training, staff awareness of chemicals on site, emergency plan
- .12 The Contractor shall be responsible to ensure that all individual accessing the roof is properly trained in Fall Arrest and Fall Protection as required by the Ministry of Labour of Ontario. Anyone not in possession of a certification card should not be allowed on the roof.

## PART 2 - PRODUCTS

### 2.1 NOT USED

- .1 Not used.

## PART 3 - EXECUTION

### 3.1 NOT USED

- .1 Not used.

16-05-2022

**PART 1 - GENERAL****1.1 CONSTRUCTION FIRE SAFETY**

- .1 The Contractor shall provide construction fire safety in accordance with the National Fire Code of Canada.

**1.2 FIRE DEPARTMENT BRIEFING**

- .1 Departmental Representative will co-ordinate arrangements for Pre-Commencement Meeting following contract award. Contractors will be briefed on Fire Safety by the Fire Chief or his designated representative before work starts.

**1.3 REPORTING FIRES**

- .1 The Contractor shall inform the Departmental Representative and Fire Chief of all fire incidents at the construction site, regardless of size.
- .2 Know location of nearest fire alarm pull station and telephone, including emergency phone number.
- .3 Report immediately fire incidents to Fire Department as follows:
  - .1 Activate nearest fire alarm pull station.
  - .2 Telephone.
- .4 Person activating fire alarm pull station will remain at the front entrance to direct Fire Department to scene of fire.
- .5 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify location.

**1.4 FIRE SAFETY PLAN**

- .1 Submit a fire safety plan for the construction site prior to commencement of construction work. The fire safety plan shall conform to the National Fire Code of Canada.
- .2 The fire safety plan shall be submitted to the Departmental Representative for review by local fire department. Any comments by local fire department shall be implemented by the Contractor.
- .3 The fire safety plan shall be limited to the area of construction only. Contractor is not responsible for amending fire safety plans in existing buildings.
- .4 Post the fire safety plan at the entrance to the construction site or near the construction site's health and safety board.
- .5 The fire safety plan shall conform to the National Fire Code of Canada, and shall contain, at minimum:
  - .1 Emergency procedures to be used in case of fire, including:
    - .1 Sounding the fire alarm;
    - .2 Notifying the fire department;
    - .3 Instructing occupants on procedures to be followed when the fire alarm sounds;
    - .4 Evacuating occupants, including special provisions for persons requiring assistance; and

16-05-2022

- .5 Confining, controlling and extinguishing fires.
- .2 The appointment and organization of designated supervisory staff to carry out fire safety duties.
- .3 The training of supervisory staff and other occupants in their responsibilities for fire safety.
- .4 Documents including diagrams, showing the type, location and operation of building fire emergency systems.
- .5 The holding of fire drills (where applicable).
- .6 The control of fire hazards in the building.
- .7 The inspection and maintenance of building facilities provided for the safety of occupants.

#### 1.5 FIRE WARNING SYSTEM

- .1 A fire warning shall be provided to notify construction personnel of a fire emergency in the construction area.
- .2 The system used shall be capable of being heard throughout the building.

#### 1.6 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

- .1 Fire protection and alarm system will not be:
  - .1 Obstructed.
  - .2 Shut-off.
  - .3 Left inactive at end of working day or shift without prior written authorization from the Fire Chief.
- .2 Do not use Fire hydrants, standpipes or hose systems for other than fire-fighting purposes unless authorized by the Fire Chief.

#### 1.7 FIRE PROTECTION SYSTEM IMPAIRMENT

- .1 Notify the PSPC Representative and the Fire Chief 48 hours prior to shutting down any active fire protection system, including water supply, fire suppression, fire detection and life safety systems.
- .2 Where a fire protection system that provides fire alarm monitoring is impaired in an existing building, a fire watch may be required at the discretion of the Fire Chief.
- .3 Implement all fire protection system impairments in accordance with the National Fire Code of Canada and Base Fire Orders. Fire Orders will be provided at the Pre-Commencement Meeting.

#### 1.8 FIRE EXTINGUISHERS

- .1 In addition to other requirements of this specification, supply fire extinguishers, as scaled by the Fire Chief, necessary to protect work in progress and contractor's physical plant on site.
- .2 Fire extinguishers may be required in the following areas as directed by the Fire Chief
  - .1 Adjacent to hot works;
  - .2 In areas where combustibles are stored;
  - .3 Near or on any internal combustion engines;



16-05-2022

- .4 Adjacent to areas where flammable liquids or gases are stored or handled;
- .5 Adjacent to temporary oil fired or gas fired equipment; and
- .6 Adjacent to bitumen heating equipment.
- .3 Extinguishers shall be sized as 4-A:40-B:C (20 lbs) unless otherwise directed by the Fire Chief.
- .4 Extinguishers shall be of the dry chemical type unless otherwise required by the hazard being protected.
- .5 The Contractor may assume the quantity of extinguishers based on a maximum travel distance between extinguishers of 75 feet.

#### 1.9 INSTALLATION OR REPAIR OF ROOFS

- .1 Notify the Fire Chief of location of asphalt kettles and dates that kettles will be in use. Ensure personnel use and take precautions as follows:
  - .1 Use kettles equipped with thermometers or gauges in good working order.
  - .2 Locate kettles in safe place outside of building or, if approved by the Fire Chief, on non-combustible roof. Locate to avoid danger of igniting combustible material below.
  - .3 Maintain continuous supervision while kettles are in operation and provide metal covers for kettles to smother flames in case of fire. Provide fire extinguishers as required in 1.8.
  - .4 Prior to start of work, demonstrate container capacities to the Fire Chief.
  - .5 Use only glass fibre roofing mops.
  - .6 Do not leave used roofing mops unattended on roof. Store mops away from building and combustible materials.
  - .7 Store roofing materials no closer than 3.0 m from structures.

#### 1.10 ACCESS FOR FIRE FIGHTING

- .1 Access for firefighting shall be provided in accordance with the National Fire Code of Canada.
- .2 Advise the Fire Chief of work that would impede fire apparatus response. This includes violation of minimum horizontal and overhead clearance, as prescribed by the Fire Chief, erecting of barricades and digging of trenches.
- .3 Minimum horizontal clearance: clear width of not less than 5m, or as defined by the Fire Chief.
- .4 Minimum vertical clearance: overhead height of not less than 6m, or as defined by the Fire Chief.

#### 1.11 SMOKING PRECAUTIONS

- .1 Smoking is prohibited in all buildings. Observe posted smoking restrictions near existing buildings.

#### 1.12 RUBBISH AND WASTE MATERIALS

- .1 Keep rubbish and waste materials at minimum quantities.
- .2 Burning of rubbish is prohibited.
- .3 Remove rubbish from work site at end of work day or shift or as directed.

16-05-2022

.4 Storage:

- .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.
- .2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove specified.

1.13 FLAMMABLE AND COMBUSTIBLE LIQUIDS

- .1 Handle, store and use of flammable and combustible liquids in accordance with the National Fire Code of Canada.
- .2 Keep flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Obtain written authorization from Fire Chief for storage of quantities of flammable and combustible liquids exceeding 45 litres.
- .3 Do not transfer flammable or combustible liquids inside buildings or on jetties.
- .4 Do not transfer flammable or combustible liquids in vicinity of open flames or any type of heat-producing devices.
- .5 Do not use flammable liquids having flash point below 38 degrees C such as naphtha or gasoline as solvents or cleaning agents.
- .6 Store flammable and combustible waste liquids, for disposal, in approved containers located in safe ventilated area. Keep quantities to a minimum and notify Fire Chief when disposal is required.

1.14 HOT WORKS

- .1 The Contractor shall implement a hot works program in accordance with the National Fire Code of Canada and NFPA 51 Standard for Fire Prevention during Welding, Cutting and Other Hot Work.
- .2 The Contractor shall obtain from the Fire Chief a "Hot Work" permit for all hot works in the construction area. Frequency of renewal for hot works permits is at the discretion of the Fire Chief.
- .3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of the Fire Chief.
- .4 Provide fire watch service for work on scale established and in conjunction with the Fire Chief as defined in the Fire Department Briefing. Fire watchers shall be trained in the use of fire extinguishing equipment.
- .5 Area of hot works:
  - .1 Hot works shall be carried out in an area free of combustible and flammable content.
  - .2 Where 1.14.5.1 is not possible,
    - .1 All flammable and combustible materials within 15m of the hot works shall be protected in accordance with the National Fire Code of Canada;
    - .2 A fire watch shall be provided during the hot work and for a period of not less than 60 minutes unless otherwise directed by the Fire Chief;

16-05-2022

- .3 A final inspection of the hot work area shall be conducted not less than four (4) hours after the completion of hot works unless otherwise directed by the Fire Chief.
- .3 Where there is a possibility of sparks leaking onto combustible materials in areas adjacent to the areas where the hot work is carried out.
  - .1 Openings in walls, floors or ceilings shall be covered or closed to prevent the passage of sparks to such adjacent areas, or
  - .2 Sentence 1.14.5.2 shall apply for those areas.
- .6 Protection of flammable and combustible materials
  - .1 Any combustible or flammable material, dust or residue shall be
    - .1 Removed from the area where hot works is carried out; or
    - .2 .Protected from ignition by non combustible materials.
- .7 Fire extinguisher
  - .1 A fire extinguisher shall be provided within 3 m of all hot works. Minimum size shall be 20lbs ABC unless otherwise directed by Fire Chief.

#### 1.15 HAZARDOUS SUBSTANCES

- .1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, shall be in accordance with National Fire Code of Canada.
- .2 Provide ventilation where flammable liquids, such as lacquers or urethanes are used. Eliminate all sources of ignition. Inform the Fire Chief prior to and at completion of such work.

#### 1.16 PARTIAL OCCUPANCY

- .1 Implement partial occupancy procedures as defined in the drawings and specifications. Partial occupancy is where construction occurs adjacent to work areas occupied by Departmental or Canadian Forces personnel. This includes:
  - .1 Phased new construction.
  - .2 Early or partial occupancy of new construction.
  - .3 New construction being added onto an existing building.
  - .4 Renovation or recapitalization of an existing building.
  - .5 Phased renovation or recapitalization of an existing building.
- .2 Where partial occupancy occurs, Contractor shall implement requirements as found in the drawings and specifications. This may include construction of a rated fire separation between occupied and construction areas as required by the National Fire Code.
- .3 A watch, with tours at intervals of not less than one hour, shall be provided throughout demolition sites when there are occupants in the portion of the building not being demolished.
- .4 .4 Except where a building is provided with a fire alarm system or similar equipment, a watch, with tours at intervals of not more than one hour, shall be provided when a portion of the building is occupied while construction operations are taking place.

1.17 QUESTIONS AND/OR CLARIFICATION

- .1 Direct questions or clarification on Fire Safety in addition to above requirements to the Departmental Representative.
- .2 Departmental is responsible to obtain clarifications from the Fire Chief. The Contractor is not to liaise directly with the Fire Chief for notification, authorization or any requests unless the situation constitutes an immediate emergency.

1.18 1.18 FIRE INSPECTION

- .1 Co-ordinate site inspections by the Fire Chief through Departmental Representative.
- .2 Allow the Fire Chief unrestricted access to work site.
- .3 Co-operate with the Fire Chief during routine fire safety inspection of work site.
- .4 Immediately remedy unsafe fire situations observed by the Fire Chief.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.
- .2 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

### 1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's, other than those identified in Section 01 14 25 are discovered in course of work.

### 1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

### 1.4 NATIONAL PARKS ACT

- .1 For projects located within boundaries of National Park, perform Work in accordance with National Parks Act.

### 1.5 RELICS AND ANTIQUITIES

- .1 Relics and antiquities, and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tables, and similar objects found on site shall remain the property of Parks Canada. Protect such articles and request directives from Departmental Representative.
- .2 Should historic objects be uncovered during excavating, stop work immediately and notify the Departmental Representative. Do not resume work until directed to by the Departmental Representative.

### 1.6 IAQ - INDOOR AIR QUALITY

- .1 Comply with CSA-Z204-94(R1999), Guideline for Managing Indoor Air Quality in Office Buildings and CSA B651-12.

### 1.7 ACCESSIBLE DESIGN

- .1 Comply with CSA B651-12, Accessible Design for the Built Environment, unless specified otherwise. In any case of conflict or discrepancy between the building codes and CSA B651, the requirements of CSA B651 shall apply.

### 1.8 TAXES

- .1 Pay applicable Federal, Provincial and Municipal taxes.

### 1.9 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.

16-05-2022

## PART 2 - PRODUCTS

### 2.1 NOT USED

.1 Not Used.

## PART 3 - EXECUTION

### 3.1 NOT USED

.1 Not Used.

## PART 1 - GENERAL

### 1.1 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections, or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any 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.

### 1.2 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

### 1.3 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 an orderly sequence so as not to cause delay 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.

### 1.4 REPORTS

- .1 Submit four (4) 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.

### 1.5 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Departmental Representative and may be authorized as recoverable.

### 1.6 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .2 Construct in all locations acceptable to Departmental Representative.

16-05-2022

- .3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Departmental Representative will assist in preparing a schedule fixing dates for preparation.
- .6 Mock-ups may remain as part of Work.

#### 1.7 MILL TESTS

- .1 Submit mill test certificates as requested.

#### 1.8 EQUIPMENT AND SYSTEMS

- .1 Submit testing, adjusting and balancing reports for mechanical systems.

### PART 2 - PRODUCTS

#### 2.1 NOT USED

- .1 Not Used.

### PART 3 - EXECUTION

#### 3.1 NOT USED

- .1 Not Used.



16-05-2022

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

### 1.2 REFERENCES

- .1 Canadian Green Building Council (CaGBC)
  - .1 LEED Canada-NC Version 1.0- [December 2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations.

### 1.3 SUBMITTALS

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

### 1.4 INSTALLATION AND REMOVAL

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

### 1.5 WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance, and removal.
- .3 Pay for utility charges at prevailing rates.

### 1.6 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance, and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of Work.
  - .2 Protect Work and products against dampness and cold.
  - .3 Prevent moisture condensation on surfaces.
  - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10°C in areas where construction is in progress.
- .5 Ventilating:

16-05-2022

- .1 Prevent accumulations of dust, fumes, mists, vapours, or gases in areas occupied during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4 Ventilate storage spaces containing hazardous or volatile materials.
  - .5 Ventilate temporary sanitary facilities.
  - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

#### 1.7 TEMPORARY POWER AND LIGHT

- .1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 120 Volts 30 Amps.
- .2 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance, and removal.
- .3 Temporary power for electric cranes and other equipment requiring, in excess of the above is the responsibility of Contractor.
- .4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

#### 1.8 FIRE PROTECTION

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

### PART 2 - PRODUCTS

#### 2.1 NOT USED

- .1 Not Used.

### PART 3 - EXECUTION

#### 3.1 NOT USED

- .1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
  - .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA 0121-08, Douglas Fir Plywood.
  - .3 CSA Z797-09, Code of practice for Access Scaffold.
  - .4 CAN/CSA-Z321-R2006, Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.

### 1.2 SUBMITTALS

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

### 1.3 INSTALLATION AND REMOVAL

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

### 1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CSA Z797.
- .2 Provide and maintain scaffolding, ramps, ladders, platforms, and temporary stairs.

### 1.5 HOISTING

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

### 1.6 ELEVATORS

- .1 Designated freight elevators may be used by construction personnel and transporting of materials. Co-ordinate uses with Departmental Representative.
- .2 Provide protective coverings for finish surfaces of cars and entrances.

16-05-2022

**1.7 SITE STORAGE/LOADING**

- .1 Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

**1.8 CONSTRUCTION PARKING**

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

**1.9 SECURITY**

- .1 Pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

**1.10 OFFICES**

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

**1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

**1.12 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

**1.13 CONSTRUCTION SIGNAGE**

- .1 No signs or advertisements, other than warning signs, are permitted on site.

**1.14 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watchpersons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

16-05-2022

- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .9 Dust control: adequate to ensure safe operation at all times.
- .10 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .11 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .12 Provide snow removal during period of Work.
- .13 Remove, upon completion of work, haul roads designated by Departmental Representative.

#### 1.15 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material.

## PART 2 - PRODUCTS

### 2.1 NOT USED

- .1 Not Used.

## PART 3 - EXECUTION

### 3.1 NOT USED

- .1 Not Used.

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 52 00 - Construction Facilities.

### 1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
  - .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA):
  - .1 CSA-O121-08, Douglas Fir Plywood.

### 1.3 INSTALLATION AND REMOVAL

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

### 1.4 HOARDING

- .1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- .2 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Maintain fence in good repair.

### 1.5 GUARD RAILS AND BARRICADES

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

### 1.6 WEATHER ENCLOSURES

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

### 1.7 DUST TIGHT SCREENS

- .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

**1.8 ACCESS TO SITE**

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

**1.9 PUBLIC TRAFFIC FLOW**

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

**1.10 FIRE ROUTES**

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

**1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

**1.12 PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule three (3) working days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

**PART 2 - PRODUCTS****2.1 NOT USED**

- .1 Not Used.

**PART 3 - EXECUTION****3.1 NOT USED**

- .1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.

### 1.2 REFERENCES

- .1 Within text of specifications, reference may be made to reference standards.
- .2 Conform to these standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 The cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.
- .6 OPSS Ontario Provincial Standard Specifications and OPSP Ontario Provincial Standard Drawings quoted in these specifications are available online at <http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>.

### 1.3 QUALITY

- .1 Products, materials, equipment, and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

### 1.4 METRIC SIZED MATERIALS

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
- .2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.
- .3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for



16-05-2022

consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.

- .4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.
- .5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

#### 1.5 STORAGE, HANDLING AND PROTECTION

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

#### 1.6 TRANSPORTATION

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

#### 1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

16-05-2022

**1.8 QUALITY OF WORK**

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

**1.9 CO-ORDINATION**

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves, and accessories.

**1.10 CONCEALMENT**

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls, and ceilings, except where indicated otherwise.
- .2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

**1.11 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

**1.12 LOCATION OF FIXTURES**

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

**1.13 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour, and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

16-05-2022

**1.14 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No.304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

**1.15 PROTECTION OF WORK IN PROGRESS**

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

**1.16 EXISTING UTILITIES**

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

**PART 2 - PRODUCTS****2.1 NOT USED**

- .1 Not Used.

**PART 3 - EXECUTION****3.1 NOT USED**

- .1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practise in Place of Work, acceptable to Departmental Representative.

### 1.2 SURVEY REFERENCE POINTS

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

### 1.3 SURVEY REQUIREMENTS

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

### 1.4 EXISTING SERVICES

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

### 1.5 LOCATION OF EQUIPMENT AND FIXTURES

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

16-05-2022

- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

#### 1.6 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed, and abandoned service lines.

#### 1.7 SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

### PART 2 - PRODUCTS

#### 2.1 NOT USED

- .1 Not Used.

### PART 3 - EXECUTION

#### 3.1 NOT USED

- .1 Not Used.

## PART 1 - GENERAL

### 1.1 SUBMITTALS

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

### 1.2 MATERIALS

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

### 1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

### 1.4 EXECUTION

- .1 Execute cutting, fitting, and patching to complete Work.

16-05-2022

- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Submit proposed materials, finishes and installation method for patching to Departmental Representative for approval, prior to patching.
- .11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

#### 1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21.

### PART 2 - PRODUCTS

#### 2.1 NOT USED

- .1 Not Used.

### PART 3 - EXECUTION

#### 3.1 NOT USED

- .1 Not Used.

16-05-2022

## PART 1 - GENERAL

### 1.1 DEFINITIONS

- .1 Cost/Revenue Analysis Workplan (CRAW): Based on information from WRW and intended as financial tracking tool for determining economic status of waste management practices.
- .2 Demolition Waste Audit (DWA): Relates to actual waste generated from project.
- .3 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .4 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.
- .5 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .6 Recycling: Process of sorting, cleansing, treating, and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .7 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items including pallets or unused products to vendors.
- .8 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .9 Separate Condition: Refers to waste sorted into individual types.
- .10 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.
- .11 Waste Audit (WA): Detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling, and landfill. Refer to Schedule A. Target for this project is [50] [75] [95] % diversion from landfill.
- .12 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal, and reporting requirements.
- .13 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

### 1.2 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
  - .1 Waste Audit.
  - .2 Waste Reduction Workplan.



16-05-2022

- .3 Material Source Separation Plan.
- .4 Schedules [A,] [B,] [C,] [D] and [E] completed for project.

### 1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.
- .2 Prepare and submit following prior to project start-up:
  - .1 Submit two (2) copies of completed Waste Audit (WA): Schedule A.
  - .2 Submit two (2) copies of completed Waste Reduction Workplan (WRW): Schedule B.
  - .3 Submit two (2) copies of completed Demolition Waste Audit (DWA): Schedule C.
  - .4 Submit two (2) copies of Cost/Revenue Analysis Workplan (CRAW): Schedule D.
  - .5 Submit two (2) copies of Materials Source Separation Program (MSSP) description.
- .3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
  - .1 Failure to submit could result in hold back of final payment.
  - .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, or disposed of.
  - .3 For each material reused, sold, or recycled from project, include amount in tonnes and the destination.
  - .4 For each material land filled or incinerated from project, include amount in tonnes

### 1.4 WASTE AUDIT (WA)

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

### 1.5 WASTE REDUCTION WORK PLAN (WRW)

- .1 Prepare WRW prior to project start-up.
- .2 WRW should include but not limited to:
  - .1 Destination of materials listed.
  - .2 Deconstruction/disassembly techniques and sequencing.
  - .3 Schedule for deconstruction/disassembly.
  - .4 Location.
  - .5 Security.
  - .6 Protection.

16-05-2022

- .7 Clear labelling of storage areas.
- .8 Details on materials handling and removal procedures.
- .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .4 Describe management of waste.
- .5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
- .6 Post WRW or summary where workers at site can review content.
- .7 Set realistic goals for waste reduction, recognize existing barriers, and develop strategies to overcome these barriers.
- .8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.
- 1.6 DEMOLITION WASTE AUDIT (DWA)
  - .1 Prepare DWA prior to project start-up.
  - .2 Complete DWA: Schedule C.
  - .3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.
- 1.7 COST/REVENUE ANALYSIS WORKPLAN (CRAW)
  - .1 Prepare CRAW: Schedule D.
- 1.8 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)
  - .1 Prepare MSSP and have ready for use prior to project start-up.
  - .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
  - .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
  - .4 Provide containers to deposit reusable and recyclable materials.
  - .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
  - .6 Locate separated material[s] in area[s] which minimize material damage.
  - .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
    - .1 Transport to approved and authorized recycling facility or to users of material for recycling.
  - .8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.
    - .1 Ship materials to site operating under Certificate of Approval.
    - .2 Materials must be immediately separated into required categories for reuse or recycling.

16-05-2022

## 1.9 WASTE PROCESSING SITES

### .1 Province of: Ontario.

Name: Ontario Ministry of Environment, St. Clair Avenue West, Toronto, ON, M4V 1P5.

Telephone: 800-565-4923 or 416-323-4321.

Fax: 416-323-4682.

### .2 Recycling Council of Ontario: 51 Wolseley Street, 2nd Floor, Toronto, ON, M5T 1A4.

Telephone: 416-657-2797

Fax: 416-960-8053

Email: [rco@rco.on.ca](mailto:rco@rco.on.ca).

Internet: <http://www.rco.on.ca/>.

## 1.10 STORAGE, HANDLING AND PROTECTION

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

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

### .3 Protect, stockpile, store and catalogue salvaged items.

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

### .5 Protect structural components not removed for demolition from movement or damage.

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

### .7 Protect surface drainage, mechanical and electrical from damage and blockage.

### .8 Separate and store materials produced during dismantling of structures in designated areas.

### .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

#### .1 On-site source separation is recommended.

#### .2 Remove co-mingled materials to off-site processing facility for separation.

#### .3 Provide waybills for separated materials.

## 1.11 DISPOSAL OF WASTES

### .1 Do not bury rubbish or waste materials.

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

### .3 Keep records of construction waste including:

#### .1 Number and size of bins.

16-05-2022

- .2 Waste type of each bin.
  - .3 Total tonnage generated.
  - .4 Tonnage reused or recycled.
  - .5 Reused or recycled waste destination.
  - .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
  - .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.
- 1.12 USE OF SITE AND FACILITIES
- .1 Execute work with least possible interference or disturbance to normal use of premises.
  - .2 Provide temporary security measures approved by Departmental Representative].
- 1.13 SCHEDULING
- .1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

## PART 2 - PRODUCTS

### 2.1 NOT USED

- .1 Not Used.

## PART 3 - EXECUTION

### 3.1 APPLICATION

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

### 3.2 CLEANING

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

### 3.3 DIVERSION OF MATERIALS

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

16-05-2022

## .3 Demolition Waste:

<u>Material Type</u>	<u>Recommended Diversion %</u>	<u>Actual Diversion %</u>
Ballast (Aggregate)	100	
Thermal Insulation	100	
Waterproofing Membranes	50	
Mechanical Equipment	100	
Sheet Metal Flashings	100	
Wood (uncontaminated)	100	
Other		

## .4 Construction Waste

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

## 3.4 WASTE AUDIT (WA)

## .1 The following pertains to Schedule A - Waste Audit (WA):

- .1 Column-1 refers to the category of waste, Column-2 refers to the total quantity of materials received by the Contractor. Measurement units must be specified. Column-3 refers to the estimated percentage of material that is waste. Column-4 refers to the total quantity of waste (column-2 x column-3). Column-5 refers to the areas(s) in which the waste was generated. Column-6 refers to the total percentage of recycled material from the specified total quantity of waste (column-4). Column-7 refers to the total percentage of reused material from the specified total quantity of waste (column-4).

## .2 Schedule A - Waste Audit (WA)

1	2	3	4	5	6	7
Material Category	Material Quantity Unit	Estimated (%)	Total Quantity of Waste (Unit)	Generation Point	% Recycled	% Re-used
Wood & Plastics						
Other						

## 3.5 WASTE REDUCTION WORK PLAN (WRW)

## .1 The following pertains to Schedule B - Waste Reduction Workplan (WRW):

16-05-2022

- .1 Column-1 refers to the category and type of waste materials. Column-2 refers to the persons responsible for completing the WRW. Column-3 refers to Column-4 of Schedule A. Column-4 refers to the amount of reused waste predicted and realized. Column-5 refers to the amount of recycled waste predicted and realized. Column-6 refers to the approved recycling facility.

.2 Schedule B

1	2	3	4	5	6
Material Category	Person Responsible	Total Quantity of Waste (Unit)	Reused Amount (units) - Projected	Reused Amount (units) - Projected	Material(s) Destination
Wood & Plastics					
Other					

3.6 DEMOLITION WASTE AUDIT (DWA)

- .1 The following pertains to Schedule C - Demolition Waste Audit (DWA):

- .1 Column-1 refers to the type of material salvaged. Column-2 refers to the material quantity shown in column-1. Several columns may be required to identify specific demolition areas. Column-3 refers to the unit of measurement used to describe Column-2. Column-4 refers to the total quantity of salvaged material. Column-5 refers to the cumulative volume of salvaged material. Column-6 refers to the total weight in kilograms. Column-7 refers to remarks and assumptions made about the specified material.

.2 Schedule C - Demolition Waste Audit (DWA)

1	2	3	4	5	6	7
Material Description	Quantity	Unit	Total	Volume (cum)	Weight (cum)	Remarks and Assumptions
Wood & Plastics						
Other						

3.7 COST/REVENUE ANALYSIS WORK PLAN (CRAW)

- .1 The following pertains to Schedule D - Cost/Revenue Analysis Work plan (CRAW):

- .1 Column-1 refers to the type of material salvaged. Column-2 refers to the total quantity of material shown in Column-1. Column-3 refers to the cumulative volume of salvaged material. Column-4 refers to the total weight in kilograms. Column-5 refers to either the cost associated with disposal indicated with a (-), or the credit received from disposal indicated with a (+). Column-6 refers to the sub-total of column-5 for individual categories. Row-7 refers to summation of all column-6. A negative total indicates a cost. A positive total indicates revenue.

.2 Schedule D - Cost/Revenue Analysis Workplan (CRAW)

16-05-2022

1	2	3	4	5	6	7
Material Description	Total Quantity (unit)	Volume (cum)	Weight (cum)	Deposal Cost/Credit t \$(+/-)	Category Sub-total t \$(+/-)	Cost Revenue (+/-)
Wood & Plastics						
Other						

## 3.8 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

## .1 Schedule E - Government Chief Responsibility

Ontario Ministry of Environment and Energy  
135 St Clair Avenue West  
Toronto, ON,  
M4V 1P5  
1.416.323.4321 / 1.800.565.4923

Environment Canada  
Toronto, ON  
1.416.734.4494

16-05-2022

## PART 1 - GENERAL

### 1.1 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned after final inspection, with Departmental Representative's comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four (4) final copies of maintenance manuals and commissioning documentation in English.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged, or defective, and of same quality and manufacture as products provided in Work.
- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8 Pay costs of transportation.

### 1.2 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings.
  - .1 Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by process flow, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text, fold larger drawings to size of text pages.
- .9 Provide [1:1] scaled CAD files in dwg format. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, [MS Project] and AutoCAD dwg files on USB compatible with PSPC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

### 1.3 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project.
  - .1 Date of submission; names,
  - .2 Addresses, and telephone numbers of Contractor, with name of responsible parties.



16-05-2022

- .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly 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.

#### 1.4 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Amendments and addenda.
  - .4 Change Orders and other modifications to the Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry, and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.
- .6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit files on USB compatible with PSPC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.
- .7 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

16-05-2022

**1.5 RECORDING ACTUAL SITE CONDITIONS**

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed particularly optional items and substitute items.
  - .2 Changes made by Amendments and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

**1.6 FINAL SURVEY**

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

**1.7 EQUIPMENT AND SYSTEMS**

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts.
  - .1 Give function, normal operation characteristics, and limiting conditions.
  - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.

16-05-2022

- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
  - .1 Include regulation, control, stopping, shutdown, and emergency instructions.
  - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00.
- .15 Additional requirements: As specified in individual specification sections.

## 1.8 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

## 1.9 MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site, place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

16-05-2022

**1.10 SPECIAL TOOLS**

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site, place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

**1.11 STORAGE, HANDLING AND PROTECTION**

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

**1.12 WARRANTIES AND BONDS**

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principals.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within [ten] days after completion of the applicable item of work.
- .4 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until the Date of Certificate of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

**PART 2 - PRODUCTS****2.1 NOT USED**

- .1 Not Used.

**PART 3 - EXECUTION****3.1 NOT USED**

- .1 Not Used.

16-05-2022

**PART 1 - GENERAL****1.1 GENERAL**

- .1 Comply with requirements of this Section when performing following Work: Type 1 Operation.
  - .1 Removal of lead-containing coatings with a chemical gel or paste on walls and as indicated on drawings.
  - .2 Removal of lead-containing coatings or materials using a power tool with an effective dust collection system equipped with a HEPA filter on walls and as indicated on drawings.
  - .3 Removal of lead-containing coatings or materials with non-powered hand tool, other than manual scraping and sanding on walls and as indicated on drawings.

**1.2 REFERENCES**

- .1 Ontario Ministry of Labour
  - .1 Occupational Health and Safety Branch, Guideline Lead on Construction Projects, September 2004, and O. Reg. 490/09 respecting Designated Substances - Lead made under the Occupational Health and Safety Act as amended by O. Reg. 148/12 and O. Reg. 149/12.
- .2 Department of Justice Canada
  - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada
  - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .4 Human Resources and Social Development Canada (HRSDC)
  - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .5 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .6 U.S. Environmental Protection Agency (EPA)
  - .1 EPA 747-R-95-007, Sampling House Dust for Lead.
- .7 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
  - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .8 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances

16-05-2022

- .1 Lead in Construction Regulation - 29 CFR 1926.62-1993.
- .9 Underwriters' Laboratories of Canada (ULC)
- .10 Report of the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario, 1984.

### 1.3 DEFINITIONS

- .1 . HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibers greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Departmental Representative or designated representative(s).
- .3 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.
- .4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- .5 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/m<sup>3</sup>) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic meter of air for removal of lead-based paint by methods noted in paragraph 1.1.
- .6 Competent person: Individual(s) or Departmental Representative(s) capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.
- .7 Lead dust: wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

### 1.4 SUBMITTALS

- .1 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead-based paint waste in accordance with requirements of authority having jurisdiction.
- .2 Quality Control:
  - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead-based paint waste and proof that lead-based paint waste have been received and properly disposed.
  - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.

### 1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to lead paint, provided that in case of conflict among those

16-05-2022

requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 of the NMS.

.2 Safety Requirements: worker and visitor protection.

.1 Protective equipment and clothing to be worn by workers and visitors in work Area include:

.1 Respirator NIOSH approved and equipped with replaceable HEPA filter cartridges with an assigned protection factor of 10 or acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure. Provide enough filters.

.2 Half mask respirator: half-mask particulate respirator with N, R or P - series filter compatibility, and at least 95% efficiency could be provided.

.3 It should be noted that respirators may not be necessary if general work procedures are followed and if level of lead in the air is less than 0.05 mg/m<sup>3</sup>.

.2 Eating, drinking, chewing, and smoking are not permitted in work area.

.3 Ensure workers wash hands and face when leaving work area. Facilities for washing are located as directed by the Facility Personnel.

.4 Visitor Protection:

.1 Provide approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors procedures to be followed in entering and exiting work area.

## 1.6 EXISTING CONDITIONS

.1 Reports and information pertaining to lead-based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are made available in the specification documents.

.2 Notify Departmental Representative of lead-based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

## 1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.2 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double

16-05-2022

thickness at least 0.152 mm thick bags or leak proof drums. Label containers with appropriate warning labels.

- .3 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

## 1.8 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify following in writing:
  - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
  - .2 Provincial Ministry of Labour.
  - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead- containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.
- .4 Hours of Work: perform work during regular business hours or as directed by Facility Maintenance Personnel.
- .5 Provide a unit rate schedule for work to be performed after regular business hours.

## 1.9 OWNER'S INSTRUCTIONS

- .1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
- .2 Instruction and training related to respirators includes, at minimum:
  - .1 Proper fitting of equipment.
  - .2 Inspection and maintenance of equipment.
  - .3 Disinfecting of equipment.
  - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Supervisory personnel to complete required training.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 Tape: fiberglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.



16-05-2022

- .3 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual lead paint residue.
- .4 Lead waste containers: metal-type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
  - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.
- .5 Paint Remover:
  - .1 Products suitable for this application:
    - .1 High-effective gel-based catalyzed paint remover.

## **PART 3 - EXECUTION**

### **3.1 SUPERVISION**

- .1 One Supervisor for every ten workers is required.
- .2 Supervisor must remain within work area during disturbance, removal, or handling of lead-based paints.

### **3.2 PREPARATION**

- .1 Remove and store items to be salvaged or reused.
  - .1 Protect and wrap items and transport and store in area specified by Departmental Representative.
- .2 Work Area:
  - .1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
  - .2 Pre-clean fixed casework and equipment within work area, using HEPA vacuum and cover and seal with polyethylene sheeting and tape.
  - .3 Clean work area using HEPA vacuum. If not practicable, use wet cleaning method. Do not raise dust.
  - .4 Seal off openings with polyethylene sheeting and seal with tape.
  - .5 Protect floor surfaces covered from wall to wall with polyethylene sheets.
  - .6 Maintain emergency fire exits or establish alternatives satisfactory to Authority having jurisdiction.
  - .7 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.
  - .8 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24-volt safety lighting and ground fault interrupter circuits

16-05-2022

on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.

.3 Do not start work until:

- .1 Arrangements have been made for disposal of waste.
- .2 Tools, equipment, and materials waste containers are on site.
- .3 Arrangements have been made for building security.
- .4 Notifications have been completed and preparatory steps have been taken.

.4 Minimum procedures for applying paint remover:

.1 Before Application of Greensolv 273C:

- .1 Mix product to obtain a uniform gel.
- .2 Clean any excessive grim from the surface to be stripped.
- .3 Make sure the surface is dry.

.2 Application of Greensolv 273C:

- .1 Apply with a brush or an airless pump, a layer of approximately 15 to 20 mils (300 microns ) thick on the surface to be stripped. Coverage: 2,2 to 2,9 m<sup>2</sup>/kg or 85 to 110 ft<sup>2</sup>/USG.
- .2 Let it work for a period of 12 to 24 hours or until the paint is stripped.
- .3 When the paint has bubbled (or has dissolved), remove it with a scraper.
- .4 Apply a second layer if necessary.

NOTE: it is important that the surface be free of water before applying a fresh layer.

.3 Follow manufacture proceed guidelines all aspects of the work, including direction for use, personal protection and storage

.4 Other approved equivalent paint remover:

- .1 Follow manufacturer's working with material guidelines.

16-05-2022

**3.3 LEAD ABATEMENT**

- .1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap; or removal equipped with HEPA filters; or removal with using power tools, non-powered hand tool, other than manual scraping and sanding.
- .2 Remove lead-based paint in small sections and pack as it is being removed in at minimum sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .4 After completion of stripping work, wire brush and wet sponge surface from which lead-based paint has been removed to remove visible material, grease, dirt and oils.

**3.4 INSPECTION**

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Departmental Representative.
- .2 Departmental Representative will inspect work for:
  - .1 Adherence to specific procedures and materials.
  - .2 Final cleanliness and completion.
  - .3 No additional costs will be allowed by Contractor for additional labor or materials required to provide specified performance level.

**3.5 LEAD SURFACE SAMPLING - WORK AREAS**

- .1 Final lead surface sampling to be conducted as follows:
  - .1 After work area has passed a visual inspection for cleanliness approved and accepted by Departmental Representative. Apply coat of lock-down agent to surfaces within enclosure, and appropriate setting period of 8 hours has passed, Departmental Representative will perform lead wipe sampling.
  - .2 Final lead wipe sampling results from horizontal and vertical surfaces must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples collected and analyzed in accordance with EPA 747-R-95-007.
  - .3 If wipe sampling results show levels of lead in excess of 40 micrograms per square foot, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.
  - .4 Repeat as necessary until fiber levels are less than 40 micrograms per square foot.

16-05-2022

**3.6 FINAL CLEANUP**

- .1 .1 Following cleaning and when lead wipe surfaces sampling are below acceptable concentrations, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to center of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

**3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS**

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

**PART 1 - GENERAL****1.1 RELATED WORK SPECIFIED ELSEWHERE**

- .1 Section 03 20 00 – Concrete Reinforcing.
- .2 Section 03 30 00 – Concrete Repair.

**1.2 REFERENCES**

- .1 Most recent revision of the following:
  - .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
  - .2 CAN/CSA-O86, Engineering Design in Wood.
  - .3 CSA O121, Douglas Fir Plywood.
  - .4 CSA O151, Canadian Softwood Plywood.
  - .5 CSA O153, Poplar Plywood.
  - .6 CAN/CSA-S269.3, Concrete Formwork.
  - .7 COFI Exterior Plywood for Concrete Formwork.

**1.3 SHOP DRAWINGS**

- .1 Submit shop drawings for formwork and falsework.
- .2 Indicate method and schedule of construction, shoring, and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.
  - .1 Comply with CAN/CSA-S269.3 for formwork drawings.
- .3 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.
- .4 Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.

**1.4 QUALITY ASSURANCE**

- .1 Design for the erection and service of concrete formwork to be done under the direct supervision of a professional engineer licensed to practice in Ontario, Canada who will also supervise the preparation of shop drawings.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Place materials defined as hazardous or toxic waste in designated containers.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .3 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Formwork materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121: SEL TF grade.
  - .2 For concrete with special architectural features, use high density formwork materials to CAN/CSA-A23.1.
- .2 Form ties:
  - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .3 Fillets for Chamfered Corners:
  - .1 Rigid formed plastic type; 20mm x 20mm size; maximum possible lengths.
- .4 Form release agent:
  - .1 colourless mineral oil with non-toxic, biodegradable and low VOC properties and which will not stain concrete or impair natural bonding or colour characteristics of coating intended for use on concrete.
- .5 Dovetail anchor slots:
  - .1 Minimum 0.65 mm thick galvanized steel, non-filled; release tape sealed slots; bend tab anchors.

## PART 3 - EXECUTION

### 3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations, and levels indicated within tolerances required by CAN/CSA-A23.1.
- .3 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .4 Do not place shores and mud sills on frozen ground.
- .5 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .6 Align form joints and make watertight to keep loss of mortar to a minimum. Keep form joints to minimum.
- .7 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion, and control joints as indicated.

- .9 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .10 Build in anchors, sleeves, drains and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes.
- .11 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

### **3.2 REMOVAL AND RE-SHORING**

- .1 Removal of load supporting formwork when concrete has reached 75% of its design strength and replace immediately with adequate re-shoring.
- .2 Provide all necessary re-shoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .3 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1. Ensure all deleterious materials are removed prior to re-use.

16-05-2022

## **PART 1 - GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 30 00 – Concrete Repair.

### **1.2 MEASUREMENT PROCEDURES**

- .1 No measurement will be made under this section. Include costs in items of concrete work for which reinforcement is required.

### **1.3 REFERENCES**

- .1 All codes, standard specifications and by-laws referred to in this section shall be current editions including all revisions, addenda, and supplements.
  - .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
  - .2 CAN/CSA-A23.3, Design of Concrete Structures for Buildings.
  - .3 CAN/CSA-G40.21, Structural Quality Steel.
  - .4 CAN/CSA-W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
  - .5 CAN/CSA-S413, Parking Structures.
  - .6 ASTM A775/A775M, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
  - .7 ACI SP-66, ACI Detailing Manual.
  - .8 Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice.
  - .9 OPSS 1442, Epoxy Coated Reinforcing Steel Bars.

### **1.4 SHOP DRAWINGS**

- .1 Submit shop drawings including placing of reinforcement.
- .2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Canada.
- .3 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, (unless otherwise indicated). Provide type A tension lap splices where indicated.
- .4 Structural Drawings shall take precedence over placement drawings and bar schedules unless otherwise indicated in writing by the Departmental Representative.
- .5 Review of the Shop Drawings is for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Contractor is responsible for confirming; correlating all quantities and dimensions and is not relieved of the responsibility for compliance with the intent of the drawings and specifications or for accuracy of the work.
- .6 Only shop drawings bearing the review stamps shall be kept at site.



16-05-2022

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials as required by local regulations. Include for all tipping fees associated with landfills and recycling depots.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- .1 Substitution of different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: deformed "Hi-Bond" grade 400 conforming with CAN/CSA-G40.21, unless indicated otherwise. All bars to have Typical Identification Patterns of Canadian Producers and standard identification requirements as shown in the RSIC Manual of Standard Practice.
- .3 Epoxy coating of non-prestressed reinforcement in conformance with OPSS 1442.
- .4 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1. Provide sufficient quantity for the support of the reinforcing under the construction conditions. Provide bracing as required to ensure that there is no possibility of displacement or deformation of the reinforcement during installation, inspection, and concrete placement. For epoxy coated bars, support bars shall be epoxy coated or non-metallic.
- .5 Mechanical splices are to be approval by a Departmental Representative.
- .6 Plain round bars conforming to CAN/CSA-G40.21.

**2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Epoxy coated bars shall not be re-bent or welded after coating.
- .3 Obtain Departmental Representative approval for locations of reinforcement splices other than those shown on placing drawings.
- .4 Upon approval of Departmental Representative weld reinforcement in accordance with CAN/CSA-W186.
- .5 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists. For epoxy coated bars, method of bundling and transportation should be in accordance with ASTM A775/A775M.
- .6 Provide reinforcing bars for all miscellaneous items as shown or implied by the drawings and/or specifications.

**2.3 SOURCE QUALITY CONTROL**

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

**PART 3 - EXECUTION****3.1 SHIPPING, HANDLING AND STORAGE**

- .1 Ship bundles clearly identified to co-ordinate with bar schedule.

16-05-2022

- .2 Reinforcement shall be stored in such a manner that it is off the ground and kept free of mud and foreign matter.
- .3 Epoxy-Coated Bars:
  - .1 Bars shall be unloaded and handled with padded contact areas and strong backs or spreader bars to minimize bar to bar abrasion.
  - .2 Bars shall be stored above ground with adequate non-abrasive support to prevent sags in the bundles.
  - .3 If the exposure time of partially embedded, exposed, or stored bars is expected to exceed 30 days, they shall be fully covered with opaque polyethylene or other equivalent protective material. Allowance for air circulation below cover is required to prevent condensation.
- .4 Epoxy-Coating Repair:
  - .1 Prior to, and after installation, bars shall be inspected for visible coating damage, and rejected or repaired. Coating damage totaling more than 1% of the surface area in any 1m length shall be rejected.
  - .2 Repair of epoxy coating shall not be carried out when the temperature of the steel or ambient air is 5°C or below, or when moisture is present on the steel.
  - .3 Repair materials and procedures shall be in accordance with the coating manufacturer's instructions. If upon request, supply the specification for repair material to the Departmental Representative.

### 3.2 FIELD BENDING

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

### 3.3 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
- .2 Prior to placing concrete, obtain Departmental Representative approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 Tolerances for Placing Reinforcement:
- .5 Conform to CAN/CSA-A23.1, CAN/CSA-S413, ASTM A775/A775M
- .6 Concrete Cover (but the concrete cover shall in no case be reduced more than one-third of the specified cover).
  - .1 Where the depth of a slab or beam, the thickness of a wall, or the smallest dimension (d) of a column is:
    - .1  $d < 200 \text{ mm} \pm 8 \text{ mm}$ .

16-05-2022

- .2      200 mm > d < 600 mm  $\pm$  12 mm.
- .3      d > 600 mm  $\pm$  20 mm.
- .4      Lateral spacing of bars  $\pm$  30 mm.
- .5      Longitudinal location of bends and ends of bars  $\pm$  50 mm.
- .6      As Item .4 at discontinuous ends of members  $\pm$  20 mm.
- .7      Chairs of the required size to accurately set bars at the cover required shall be used in all horizontal applications.
- .8      Side form spacers shall be used for all column, beam, parapet and wall construction to secure reinforcement against displacement and maintain required coverage to the vertical formwork.

16-05-2022

## **PART 1 - GENERAL**

### **1.1 RELATED SECTIONS**

- .1 N/A

### **1.2 REFERENCES**

- .1 All codes, standard specifications and by-laws referred to in this section shall be current editions including all revisions, addenda, and supplements.
  - .1 Conform to the Ontario Building Code and the Occupational Health and Safety Act
  - .2 CAN/CSA-A3000, Cement
  - .3 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction
  - .4 CAN/CSA-A23.2, Test Methods and Standard Practices for Concrete
  - .5 CAN/CSA-A23.3, Design of Concrete Structures
  - .6 CAN/CSA-A283, Qualification Code for Concrete Testing Laboratories
  - .7 SSPC, Surface Preparation Standards

### **1.3 SUBMISSIONS**

- .1 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
- .2 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.
- .3 Shop drawings showing complete details of connections to the structure, including pockets, inserts and loadings for items to be connected to and supported by the structure. Shop drawings showing typical shoring details signed and sealed by a professional Engineer licensed in Ontario or applicable Province.

### **1.4 QUALITY ASSURANCE**

- .1 Upon request, submit proposed quality control procedures for Departmental Representative review for the following items:
  - .1 Falsework erection.
  - .2 Hot weather concrete.
  - .3 Cold weather concrete.
  - .4 Curing.
  - .5 Finishes.
  - .6 Formwork removal.
  - .7 Joints.

### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with applicable local, provincial and national regulations. Include for tipping fees associated with landfills and recycling depots.

16-05-2022

- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate a cleaning area for tools to limit water use and runoff.
- .4 Carefully coordinate the specified concrete work with weather conditions.
- .5 Ensure emptied containers are sealed and stored safely for disposal away from the public.
- .6 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Portland cement: to CAN/CSA-A3000.
- .2 Supplementary cementing materials: to CAN/CSA-A3000.
- .3 Cementitious hydraulic slag: to CAN/CSA-A3000.
- .4 Water: to CAN/CSA-A23.1.
- .5 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density unless noted otherwise on drawings.
- .6 Air entraining admixture: to ASTM C260.
- .7 Chemical admixtures: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing. Calcium chloride or calcium chloride-based admixtures are **NOT** permitted.
- .8 Concrete retarders to conform to ASTM C494/C494M.
- .9 Non premixed dry pack grout: composition of non-metallic aggregate, Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 35 MPa at 28 days.
- .10 Pre-moulded joint fillers:
  - .1 Bituminous impregnated fiber board: to ASTM D1751.
  - .2 Sponge rubber: to ASTM D1752, Type I, flexible grade.
- .11 Weep hole tubes: galvanized steel or plastic with minimum 40 mm inside diameter.
- .12 Wedge anchors and Chemical Adhesive anchors shall be stainless steel unless written approval by Departmental Representative.
- .13 Patching Mortar:
  - .1 Overhead or vertical hand patch repair mortars: high performance, polymer-modified, two-component, fast-setting, non sag cementitious mortar.
  - .2 Mechanical overhead or vertical repair mortars
    - .1 Shotcrete: silica fume enhanced, pre-packaged shotcrete material for dry-process applications.

16-05-2022

- .2 Pressure Grout: Provide grout mix design. Max slump before the addition of Super Plasticizers of 50 mm
- .14 Top side, Through Slab, Slab Edge or Formed Vertical:
  - .1 Ready Mix: 35 MPa C-1 exposure, 50 mm slump before the addition of Super Plasticizers
  - .2 Ready Mix: For sidewalks 35 MPa C-2 exposure, 75 mm slump
  - .3 Ready Mix: King HP-S10 by King
- .15 Cement Slurry Bonder:
  - .1 Shall consist of one part Portland Type 10 Cement to one-part fine aggregate with sufficient water to form a heavy cream consistency.
- .16 Epoxy Anchorage:
  - .1 High-performance injectable epoxy mortar
    - .1 Hilti Hit HY 200 by Hilti
    - .2 Epcon Ceramic 6 by Epcon
- .17 Formwork Materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121: SEL TF grade.
  - .2 For concrete with special architectural features, use high density formwork materials to CAN/CSA-A23.1.
- .18 Form ties:
  - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .19 Fillets for Chamfered Corners:
  - .1 Rigid formed plastic type; 20 mm x 20 mm size; maximum possible lengths.
- .20 Form release agent:
  - .1 Colourless mineral oil with non-toxic, biodegradable and low VOC properties, which will not stain concrete or impair natural bonding or colour characteristics of coating intended for use on concrete.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- .1 Obtain Departmental Representative approval before placing concrete. Provide 48 hours notice prior to placing of concrete.

16-05-2022

- .2 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy anchorage; hold dowels in position until set time has elapsed in accordance with the epoxy manufacturers' written specification and requirements.
- .3 Provide equipment and materials capable of maintaining adequate temperature, humidity, and protection during the placement of concrete.
- .4 Formwork is to be clean of all dirt, chips, sawdust, water, snow, ice and other foreign matter prior to placement of new concrete.
- .5 Prior to placing concrete obtain Departmental Representative approval of proposed method of concrete protection during placement and curing.
- .6 Reinforcement:
  - .1 Ensure reinforcement and inserts are braced or sufficiently anchored as not to be displaced or disturbed during concrete placement.
  - .2 Reinforcing shall be prepared by sandblasting to a near white condition to remove all corrosion including underside. Wire cleaning will not be permitted.
  - .3 Where cover cannot be obtained seek direction from Departmental Representative to chase reinforcement allowing the bar to be pushed in or to berm out the repair concrete/mortar.
  - .4 Where existing reinforcement has a steel loss of 10% or more replace, or add new providing the following tension lap beyond corrosion at both ends:
    - .1 10M 380 mm.
    - .2 15M 560 mm.
    - .3 20M 760 mm.
    - .4 25M 1170 mm.
    - .5 for larger bars request direction from Departmental Representative.
    - .6 For a contact lap secure new bar tight to existing, and for a spaced lap, install no greater than 1/5 lap length away from existing.
- .7 Prior to placing of concrete obtain Departmental Representative approval of proposed method for protection of concrete during placing and curing.
- .8 Concrete Surface:
  - .1 After sandblasting is complete the repair area shall be thoroughly cleaned with compressed air. Review the repair areas and remove any loose or cracked concrete material.
  - .2 All repair areas are to be saturated with potable water a minimum 2 hours prior to concrete placement.
  - .3 Just prior to placement of new concrete apply a cement slurry to the concrete substrates using a stiff brush. Do not allow slurry to dry prior to concrete placement. Mix the cement slurry with Portland cement and potable water to a 'cream-like' consistency.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

16-05-2022

- .10 Maintain shoring and formwork at newly placed concrete areas until written confirmation has been issued by the Departmental Representative. Formwork is to be maintained until the newly placed concrete has attained a minimum 75% of its specified strength.

### 3.2 FORMWORK

- .1 Fabricate and install formwork for the underside of slab soffits, and vertical faces.
- .2 Forms are to be aligned and fitted to match the lines and levels of the existing adjacent concrete.
- .3 Where possible provide for and install a drip edge provided for in the formwork. Ensure drip edge joints are tight and fit together. Mitre 90-degree joints. Size to be 5/8" half round diameter or as required matching existing.

### 3.3 CONSTRUCTION

- .1 Complete cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Anchor bolts:
  - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
  - .2 With approval of Departmental Representative, epoxy anchor bolts in preformed holes or holes drilled after concrete has set. Drilled holes to be as per manufacturer's recommendations.
  - .3 Protect anchor bolt holes from water accumulations, snow and ice build-up.
- .3 Placing Concrete:
  - .1 Notify the Departmental Representative, for review of the preparations, at least 48 hours prior to any concrete placement operations are to proceed.
  - .2 Concrete is to be conveyed to the site by methods that will prevent the segregation or loss of material. Maximum time between adding mix water and complete discharge of the concrete into the forms is 120 minutes. Exemptions to this time frame will only be permitted with the approval of the Departmental Representative.
  - .3 Conveying and placement equipment shall be such that when concreting has started, the depositing of concrete shall be at such a rate and of such sequence that the concrete is at all times sufficiently plastic to ensure proper bonding of successive layers or panels.
  - .4 Internal vibrators shall be applied at the point of deposit in the areas of freshly placed concrete, allowed to sink by their own weight in the concrete until they penetrate into the previous layer of concrete. They shall be withdrawn immediately at the same rate at which they sank, moved about 300 mm to a new location and the process repeated. Extreme care shall be taken to ensure that internal type vibrators do not disturb the reinforcing steel or the forms.
  - .5 Plastic coated vibrators shall be used to consolidate concrete reinforced with epoxy coated bars.
  - .6 Where concrete is exposed to exterior, do not place concrete when it is raining or likely to rain. If rain begins after concrete is placed and before it is set, protect with waterproof covers until set.
  - .7 Placement of repair mortars is to at maximum lifts and intervals as recommended by manufacturer.



16-05-2022

- .4 Cold Weather Conditions:
  - .1 When air temperature is at or below or expected to be at or below 5°C, conform to the requirements of CAN/CSA A23.1 including, but not limited to the following:
    - .1 Job Preparation.
    - .2 Concrete temperature.
    - .3 Concrete Placing.
    - .4 Protection Requirements and Methods.
    - .5 Heated Enclosures.
    - .6 Protective Covers and Insulation.
    - .7 Cooling after protection.
    - .8 Cold-Weather Curing.
  - .2 All materials and equipment needed for adequate protection and curing shall be on hand and ready for use before concrete placement has started.
- .5 Hot Weather Protection:
  - .1 Conform with the requirements of CAN/CSA A23.1 and the recommendations of ACI Standard 305.

### 3.4 FINISH TREATMENT OF SLAB SURFACES

- .1 Finishing:
  - .1 Finish concrete in accordance with CAN/CSA-A23.1.
  - .2 Screed and finish the surface of the repairs to provide for drainage, or to match surrounding concrete inclusive of texture, architectural detail, etc.
  - .3 Finish edges to match the existing adjacent surfaces.
  - .4 Clean, rough edges and rub or grind smooth transitions between new and existing surfaces.
  - .5 Clean leakage and other spillage marks from the adjacent surfaces.
  - .6 Repair using repair mortar, any honeycomb, or minor voids in the concrete. If Departmental Representative deems honeycomb or new repair unacceptable and non-repairable, area to be removed and repaired according to this Section at Contractors expense.
  - .7 Unless otherwise shown or specified, slabs to receive waterproofing shall be finished with a Steel Trowel Finish to Class A classification.
  - .8 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .2 Sealing and Curing:
  - .1 Curing to conform to the requirements of CAN/CSA A23.1 and to CAN/CSA S413 including but not limited to the following:

16-05-2022

- .1 Basic Curing Period.
- .2 Additional Curing for Durability.
- .3 Additional Curing for Structural Safety.
- .4 Methods for Curing.
- .5 Cold Weather Curing.
- .6 Hot Weather Curing.
- .7 Curing for Accelerated Strength Development.
- .8 Additional Curing for Mass Concrete.

### 3.5 FIELD QUALITY CONTROL

- .1 General:
  - .1 Conform to the requirements of CAN/CSA A23.1
  - .2 Provide a competent and experienced supervisor or foreman who shall be present on the site continuously throughout each working day.
  - .3 Review by Departmental Representative or materials testing will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.
  - .4 Notify the Departmental Representative 48 hours in advance of closing-in of formwork for a review of the preparations.
- .2 Defective Concrete:
  - .1 Concrete not meeting the requirements of the specification and drawings shall be considered Defective Concrete.
  - .2 Defective Concrete and concrete not conforming to lines, details, quality and grade specified or as shown on the drawings shall be modified or replaced at no cost to the Bid Price.
  - .3 Cores drilled and tested from areas in question, as directed by the Departmental Representative and in accordance with CAN/CSA A23.1 and/or load testing of the structural elements in accordance with the requirements of the Departmental Representative shall be done at no increase to the Bid Price.
- .3 Protection:
  - .1 Fully protect exposed concrete finishes from damage and staining.

16-05-2022

## GENERAL

### 1.1 APPLICABLE PUBLICATIONS

- .1 Canadian Standards Association (CSA).
- .1 CSA A179, Mortar and Grout for Unit Masonry.

### 1.2 SAMPLES

- .1 Submit two 50mm cubes samples of mortar for testing when requested by Departmental Representative.

## PART 2 - PRODUCTS

### 2.1 LIST OF PROPOSED MATERIALS

- .1 The use of materials other than those specified herein must be approved prior to award of the Contract. If substitute materials are proposed, then the list of materials must be included as part of the Tender Form. This submittal shall include product name, number and data sheets and manufacturer's specifications and installation instructions.

### 2.2 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout to CSA A179.
- .3 Water: potable, clean and free from contaminants.
- .4 Stone Dust:
  - .1 Granite, Sandstone or Limestone dust ground to pass the 600µm sieve. Type and colour of stone to match substrate onto which it is to be placed.
- .5 Premixed Mortars:
  - .1 Mortar for Repointing: pre-bagged, factory prepared, lime/Portland cement mortar.
- .6 Accelerators or other mortar admixtures shall not be used without the written consent of the Departmental Representative.
- .7 Pigments shall be mineral oxide type, dry, powdered, inorganic pigments.

### 2.3 EQUIPMENT

- .1 All mortars are to be prepared in a mortar mill comprising of a mortar pan with adjustable cast iron sprung rollers on a cranked roller shaft and with steel scrapers and blades.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION

- .1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.
- .2 Prepare mortar as per manufacturers instructions.

## PART 1 - GENERAL

### 1.1 GENERAL

#### .1 DESCRIPTION

- .1 This section specifies the requirements for the supply and installation of the elements required for waterproofing below grade structures and above grade waterproofing.
- .2 Waterproofing system: Thermofusible SBS modified bitumen membrane.

### 1.2 MATERIALS STORAGE

- .1 Rolls of materials should be handled with care and proper equipment.
- .2 Rolls of materials shall be carefully stored and adequately protected in accordance with the manufacturer's recommendations.

### 1.3 EXTENDED WARRANTIES

- .1 For all work in this section, the 12-month warranty to be extended to 120 months.
- .2 The product manufacturer shall issue a written and signed document in the name of the owner, certifying the product will meet all the physical characteristic published by the manufacturer, starting from the date of completion of installation of membranes. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.

## PART 2 - PRODUCTS

### 2.1 WATERPROOFING MEMBRANE

- .1 Description: Membranes composed of a non-woven polyester reinforcement and SBS modified bitumen.
  - .1 Base sheet: Both faces are covered with a thermofusible plastic film.
  - .2 Cap Sheet: One face covered with a thermofusible plastic film and top face with a granular surface.
- .2 Components:
  - .1 Reinforcement: Non-woven polyester.
  - .2 Elastomeric bitumen: Mix of selected bitumen and SBS polymer.

### 2.2 PRIMER FOR HEAT WELDED MEMBRANES

- .1 Description: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied waterproofing membranes.

### 2.3 ACCESSORIES

#### .1 WATERPROOFING MASTIC

- .1 Description: A black, solvent-based mastic containing SBS modified bitumen, fibres, and mineral fillers.

#### .2 TERMINATION BAR

.1 Specified product:

- .1 Termination bar T2 by Block-Lok or stainless-steel bars 3mm thick x 25mm wide, predrilled for fasteners at 250mm o/c. Use doglegged bars for sealant terminations or similar approved by the Departmental Representative.

.3 DRAINAGE BOARD

- .1 Description: High-density drainage board composed of a polypropylene core and a highly resistant woven polypropylene filter.

.4 PROTECTION BOARD

- .1 Description: A semi-rigid protection board composed of a mineral fortified asphaltic core formed between two saturated fibreglass felts.

.2 Characteristics:

- .1 Thickness: 3 mm
- .2 Board size: Width: 1.22 m Length: 1.52 m

## PART 3 - EXECUTION

### 3.1 EXAMINATION AND PREPARATION OF SURFACES

- .1 Surface examination and preparation must be completed in conformance with recommendations in the membrane manufactures Specifications Manual.
- .2 Before waterproofing work begins, the Departmental Representative and the membrane contractor's foreman will inspect and approve substrate condition and ensure that related work has been properly executed. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of the membrane application will mean that substrate conditions are acceptable for work completion.
- .3 Before commencing work, all surfaces must be smooth, dry, clean and free of ice and debris as per manufacturer's recommendations.
- .4 No materials will be installed during rain or snowfall.
- .5 Concrete must be cured a minimum of fourteen (14) days and an adhesion test is recommended before membrane application.
- .6 Verify the compatibility of all membrane components with curing compounds, coatings or other materials which are already installed on the surfaces to be treated.
- .7 Any cracks over 3 mm wide should be reported to the design professional. After approval from the qualified authority, the crack should be filled in with waterproofing mastic. A 150 mm (6 inches) wide strip of membrane should be installed, centered over the crack.

### 3.2 METHOD OF EXECUTION

- .1 Work shall be performed on a continuous basis as surface and weather conditions allow.
- .2 Adjoining surfaces shall be protected against any damage that could result from the waterproofing installation.

### 3.3 EQUIPMENT

- .1 Maintain all equipment and tools in good working order.

### 3.4 PRIMER APPLICATION

- .1 Surface where heat-welded membrane is applied shall receive an asphalt primer coating at the rate of 0.15 to 0.20 l/m<sup>2</sup>. Application rate may vary depending on surface condition.

### 3.5 WATERPROOFING MEMBRANE INSTALLATION

- .1 All work is to be completed as per manufacturer's requirements.
- .2 To begin application, align the first roll of membrane to a previously drawn chalk line.
- .3 All inside and outside corners must be pre-stripped with a 300 mm wide strip of membrane centered over the corner. This membrane must be installed in direct contact with the substrate not leaving any voids under the membrane strip. Outside corners should be double lapped.
- .4 Weld the membrane using a propane gas torch.
- .5 Subsequent rolls must be installed in the same manner and should be aligned with the preceding roll with a side lap of at least 75 mm. End laps must be overlapped at least 100 mm.
- .6 Holes and tears in the membrane must be repaired with the appropriate membrane material. The repair must exceed the affected surface area by at least 100 mm.
- .7 Prior to backfilling, it is recommended to protect waterproofing system with protection boards. Backfilling should commence immediately after installation of protection boards.
- .8 The uppermost edge of the membrane is to be mechanically fastened to the concrete substrate using termination bars. The termination bar should surpass the top edge of the membrane.
- .9 Apply mastic on the top edge of termination bar to prevent water accumulation and infiltration.
- .10 Any waterproofing membrane left exposed after backfilling shall be protected from ultraviolet and mechanical damages.

*Note: Prior to backfilling or new stone installation (horizontal surface), it is recommended to protect the waterproofing system with protection boards adhered to membrane's surface. Backfilling should commence immediately after installation of protection boards.*

### 3.6 DRAINAGE BOARD INSTALLATION

- .1 Using a torch, melt the plastic film on the surface to cover.
- .2 Adhere the drainage panels directly on the exposed bituminous sticky surface by applying a uniform pressure on the entire surface.
- .3 Backfill as soon as possible after protection board installation within 72 hours maximum.

## **PART 1 - GENERAL**

### **1.1 REFERENCES**

- .1 All codes, standard specifications and by-laws referred to in this section shall be current editions including all revisions, addenda and supplements.
- .1 ASTM C719 – Standard Test Method for Adhesion and Cohesion of Elastomeric Sealant Joints Under Cyclic Movement (Hockman Cycle).
- .2 ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
- .3 ASTM C1193 – Standard Guide for Use of Joint Sealants.
- .4 ASTM C1311 – Standard Specification for Solvent Release Sealants.
- .5 ASTM C1330 – Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- .6 ASTM C1481 – Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS).
- .7 CAN/CGSB-19.13 – Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .8 CGSB 19-GP-5M – Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .9 CGSB 19-GP-14M – Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .10 CAN/CGSB-19.17 – One-component Acrylic Emulsion Base Sealing Compound.
- .11 CAN/CGSB-19.24 – Multi-component, Chemical Curing Sealing Compound.
- .12 SWRI (Sealant, Waterproofing and Restoration Institute) – Sealant and Caulking Guide Specification.
- .13 Sealants: The Professionals' Guide, Sealant, Waterproofing and Restoration Institute.

### **1.2 SUBMITTALS**

- .1 Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention, and field quality control testing.

### **1.3 QUALITY ASSURANCE**

- .1 Perform sealant application Work in accordance with ASTM C1193 and ASTM C1481.
- .2 Maintain one copy of document on site.
- .3 Inspection of Work will be carried out by the Departmental Representative's designated personnel.
- .4 A pre-construction meeting shall be conducted at the project site to coordinate Work and sequencing of Work.
- .5 Prior to mobilizing on site, prepare and install sealant samples for adhesion testing, a minimum of two (2) samples for each substrate combination, according to the manufacturers written guidelines. Do not proceed with Work until samples have been approved.
- .6 Remove sealant and re-caulk disapproved joints.

**1.4 MOCK-UP**

- .1 Construct mock-up with specified sealant types and with other components noted.
- .2 Construct mock-up at test window to show location, size, shape, and depth of joints complete with back-up material, primer, caulking and sealant.
- .3 Locate where directed.
- .4 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with Sealant Work.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact.
- .2 Protect from freezing, moisture, water and contact with ground or floor.

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

**1.7 WARRANTY**

- .1 The Contractor must provide a 12-month warranty for workmanship.
- .2 Include waterproofing insurance (water, air, loss of adhesion and drying) for installed sealants and accessories.
- .3 The standard manufacturer's warranty of twelve (12) month shall be applied for installed silicon sealants

**PART 2 - PRODUCTS****2.1 SEALANT MATERIAL DESIGNATIONS**

- .1 Silicone Sealant: Single component neutral cure.
  - .1 Colour of sealants shall match the existing colour and/or be approved by the Departmental Representative.
- .2 Preformed compressible and non-compressible back-up materials conforms to ASTM C1330:
  - .1 Polyethylene:
    - .1 Extruded closed cell foam backer rod.
    - .2 Size: round, oversize 25 to 33% larger than joint width.
  - .2 Bond Breaker Tape:
    - .1 Polyethylene bond breaker tape.
    - .2 Pressure sensitive tape recommended by sealant manufacturer to suit application.



- .3 Compatibility: All materials in a sealant system shall be compatible with each other, with the substrate and any coating or waterproofing to be installed. The sealants used with the elastomeric coating or waterproofing systems must be approved by the coating or waterproofing manufacturer.

## **2.2 SEALANT SELECTION**

- .1 Perimeters of exterior openings where aluminum or wood frames meet masonry or Concrete.

## **2.3 JOINT PRIMER**

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

# **PART 3 - EXECUTION**

## **3.1 GENERAL**

- .1 Protect existing facades from staining or contamination.
- .2 Prepare surface as per required by the manufacturer.
- .3 Prime areas of work as per required by the manufacturer.
- .4 Install backup material as per required by the manufacturer.
- .5 Apply new sealant as per required by the manufacturer.
- .6 Perform any modifications as per required by Departmental Representative until final approval is given.
- .7 Clean adjacent surfaces immediately and leave Work neat and clean.
- .8 Remove excess and droppings, using recommended cleaners as Work progresses.
- .9 Remove masking tape after initial set of sealants.

16-05-2022

## **GENERAL**

### **1.1 SUBMITTALS**

- .1 Submit shop drawings from the manufacturer stamped by a licensed professional engineer.
- .2 Submit manufacturer's installation instructions outlining special procedures, surface preparation requirements, perimeter conditions, and any site-specific details requiring special attention. The instructions shall also include for recommended joint design and seal size.

### **1.2 QUALITY ASSURANCE**

- .1 A pre-construction meeting will be conducted at the project site to coordinate work and sequencing of work.
- .2 The Contractor shall provide the Departmental Representative with a minimum one (1) week notice prior to mobilizing to commencing work.
- .3 Inspection of the work shall be carried out by the Departmental Representative's designated personnel. The Departmental Representative is to be notified when ready for inspection of the following milestones:
  - .1 Surface preparation.
  - .2 Installation of the expansion joint seal; and
  - .3 Water testing of the seal to confirm watertightness
- .4 Work will be reviewed on a random basis. Any work that is found to be sub-standard will be removed and replaced at no cost to the Departmental Representative.
- .5 All expansion joint seals shall be installed by manufacturer approved constructor. Approval shall be provided in writing.

### **1.3 MOCK-UP**

- .1 At the discretion of the Departmental Representative, carry out repairs at a selected location to confirm the procedures, materials, and standards for future work.
- .2 Approved mock-up installations will establish the minimum acceptable quality of workmanship and will serve as the standard by which subsequent work will be compared for acceptance.
- .3 Approved mock-ups may be part of the finished work.

### **1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 All materials shall be delivered to site in new and unopened materials complete with the manufacturer's original packaging and labels.

### **1.5 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 local Labour regulations.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 Expansion joint seals shall not be installed when ambient temperatures are below 5 degrees Celsius or when the substrate is damp or wet.

16-05-2022

**1.6 WARRANTY**

- .1 The Contractor must provide a 12-month warranty for workmanship.

**PART 2 - PRODUCTS****2.1 PREFORMED EXPANSION JOINT ASSEMBLIES**

- .1 All the components of the expansion joint assembly will form a complete system from a single source manufacturer.
- .2 All materials used will be compatible to form a waterproof seal between the traffic topping while accommodating opening and closing of the joint and differential movement across joints.
- .3 Provide watertight pre-made expansion joint materials for expansion joints and isolation joints in below grade floors, interior walls and interior ceilings, as well as for exterior slab deck joints.
  - .1 Typical locations include but are not limited to below-grade applications for joints in foundations, walls, slabs on grade, tunnels, as well as expansion joints needing a moisture/vapor barrier from both sides.
  - .2 Typical locations for exterior expansion joints include for locations with joints separating slab decks.
- .4 Sealant system shall be comprised of three components:
  - .1 Cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated on both faces with water-resistant silicone.
  - .2 Field-applied epoxy adhesive primer.
  - .3 Field-injected silicone sealant bands.
- .5 Material shall be capable of movements as specified by the manufacturer.
- .6 Manufacturer's Checklist must be completed by expansion joint subcontractor and returned to manufacturer at time of ordering material.

**2.2 FABRICATION**

- .1 To be supplied pre-compressed to less than the joint size, packaged in shrink-wrapped lengths (sticks).

**2.3 HYDROPHILIC GROUT**

- .1 Non-flammable hydrophilic polyurethane resin designed to form a flexible gasket or plug joints and cracks in concrete.

**PART 3 - EXECUTION****3.1 SUBSTRATE PREPARATION**

- .1 Provide a recess on either side of the expansion joint to accommodate for the installation of the new expansion joint assembly.
- .2 The concrete substrate shall be level, structurally sound, and free of surface delamination's, spalls, and deleterious materials that may hinder the bond of the new expansion joint assembly.
- .3 Ensure that there is sufficient depth to receive the full depth of the size material being installed. Refer to Manufacturers Installation Guide for detailed step-by-step instructions.

16-05-2022

- .4 Where required, surfaces are to be sandblasted to remove all laitance material and exposed aggregates.
- .5 Where required, mask areas adjacent to the joint to ensure a straight and continuous joint line.

### 3.2 INSTALLATION

- .1 Ensure that there is sufficient depth to receive the full depth of the size of the material being installed. Refer to Manufacturers Installation Guide for detailed step-by-step instructions.
- .2 No drilling, or screwing, or fasteners of any type are permitted to anchor the sealant system into the substrate.
- .3 Expansion joint to be installed into manufacturer's standard field-applied epoxy adhesive.
- .4 Expansion joint to be installed slightly recessed from the surface such that when the field-applied injection band of silicone is installed between the substrates and the foam-and-silicone-bellows, the system will be essentially flush with the substrate surface.
- .5 Waterproof membranes to be installed overlapping new overlapping expansion joints. 76mm reglets to be used as anchor support for membrane and fastened (screwed) every 305mm c/c. The reglet is to be a birds beak type and sealed along joint following installation. Follow manufacturer's guidelines for installation.
- .6 System to be installed by qualified sub-contractors only according to detailed published installation procedures and/or in accordance with job-specific installation instructions of manufacturer's field technician.
- .7 Mix and apply hydrophilic grout material as per drawing details and in accordance with product manufacturer's written instructions and recommendations.
- .8 Expansion joint seals are to be continuous and free of joints.
- .9 Prevent traffic from driving over the joints until the system has fully cured.

### 3.3 CLEAN UP

- .1 Perform a controlled water test to confirm the performance of the seal as per industry standard and current regulations.
- .2 Remove evidence of leakage from below.